

Norge Distributors Preview Diversified Line of Appliances

*Candid Camera Records Visit of Other Refrigerator Manufacturers to Norge Banquet
And Depicts Enjoyment Norgemen Get from Their Annual Fraternal Feast*



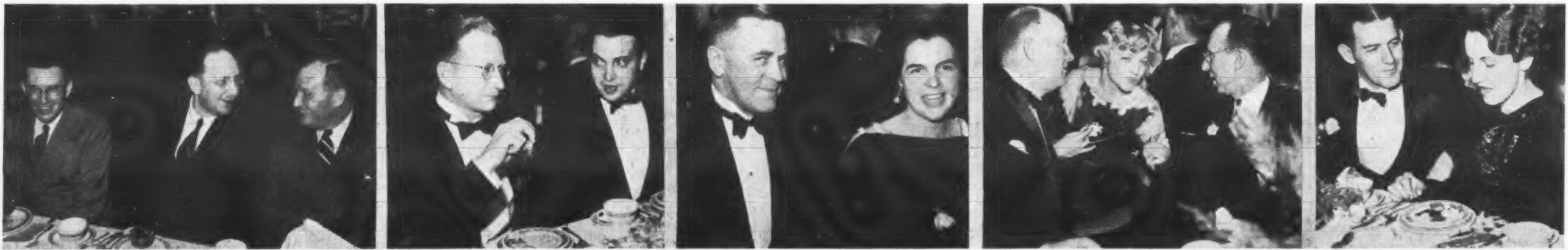
(1) A. D. McCaughna, new manager of the New York Norge office, isn't so sure but that what C. C. Crawford of Commercial Credit is insinuating is true. (2) Wilbur Arthur of the Paul Block organization, is having a hard time giving C. D. Donaven of Norge his medicine. (3) No, these two Borg-Warner officials (the one on the left is R. C. Ingersoll) didn't get into a fight over a plate of cookies, but they didn't leave any. (4) Ernie Graham and H. L. Arbuckle, assistant purchasing agent, sit aghast at the convolutions of a contortionist in the show. (5) Bill McKiggan, purchasing agent, and H. L. Spencer, national service manager, zup their soup with approval and avidity. McKiggan is probably adding mentally the cost of 300 cups of soup.



(1) Jim Sterling, H. H. Whittingham, Howard Blood, and John Knapp—four of the top-ranking Norge executives, applaud Corine Muer's show, which was even better than usual. (2) Lou Lepper, insurance man, and Erik Ekstrom of Borg-Warner pay attention to what speaker Howard Blood is saying. (3) H. W. Burritt, vice president of Kelvinator, and R. E. Densmore, Norge national sales manager, get a big kick out of Universal Cooler President Geoff Johnston's impersonation of Eddie Cantor. (4) Wilbur Arthur seems to have a lot to say to "Don" Donaven in private, and Lou Lepper (left) is getting just a wee bit curious. (5) Apparently C. C. Crawford (center) of Commercial Credit was doing a lot of work during this meeting. Here he may be seen trying to put a bug in the ear of Jack Waddell (left) Boston Norge distributor.



(1) George Lehlitner of New Orleans (left) has just thought of a good story (he's full of 'em), and in a minute he'll have Dayton Young (right), Norge washing machine sales manager, laughing over it, too. (2) Johnny Knapp, Norge vice president in charge of sales, is attacked from two sides but continues to take care of the problem before him. Paul Davis (left) and Erik Ekstrom, both of Borg-Warner, have him surrounded. (3) Dave Trilling and Harry Montague, the famous Trilmont Philadelphia distributing partnership. (4) Glenn O'Harra, who is now Norge range sales manager, and Gus Schallberg of Borg-Warner have decided that the mayonnaise on the salad isn't the right color. (5) Bill Rowles (center), Norge commercial manager, finds himself flanked by Zan Crowe (left) and A. E. Bottenfield, two spark plugs of the up-and-coming St. Louis distributorship.



(1) Charles Maurer, George Tobias, and J. B. Ogden, manager of Hudson's (Detroit department store) electrical appliance department. (2) Corry Faude (right), Cramer-Krasselt account executive, wonders what C. T. Enns of the same agency is thinking about. (3) Fred Adams, distributor from Waterloo, Iowa, and lovely Lillian Merson of the Norge home economics department. (4) Betty Appel, home economics director, tells Messrs. Joe Block and Seaton (Norge field men) that they ought to eat their spinach. (5) Lee Hansen and Marj Albright.



(1) Here are the two gentlemen who won the President's Cup in the race among Norge distributors this year: French Nestor, Florida distributor, and his brilliant young lieutenant, Allen Crook. (2) Mat Keck welcomes Charles D'Olive, refrigeration manager of Stewart-Warner, to the Norge banquet. (3) George Pizarro (right) insists that Arizona Distributor Tidmarck "be a good fellow and come along." (4) A pair of Jacks—Marmon and Motte—are enthralled by one of Corine Muer's acts. (5) L. D. Birch, patent attorney, is astounded at what he has just heard.

REFRIGERATION NEWS

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DETROIT, MICHIGAN, DECEMBER 26, 1934

Entered as second-class
matter Aug. 1, 1927THREE DOLLARS PER YEAR
TEN CENTS PER COPY**Dry Goods Men
To Study Sales
Of Appliances****Three Sessions on Electrical
Appliance Selling
Are Planned**

By George F. Taubeneck

DETROIT—When department store managers and operators from all over the nation arrive in New York Jan. 15 to attend the five-day sessions of the National Retail Dry Goods Association, they will be made electrical appliance-conscious as never before, if plans of the electrical industry go aught.

Herschel Lutes, merchandise manager of the J. L. Hudson department store in Detroit, and chairman of the electrical committee of the N.R.D.G.A., has arranged a program for the convention which includes some of the leading department store specialists in the electric refrigeration industry. Tuesday morning, Thursday morning, and Thursday afternoon sessions will be devoted to the problems of electrical appliance merchandising, with emphasis on refrigeration.

"In addition to the speeches and discussions," declares Mr. Lutes, "we hope to make the whole convention electrical appliance-conscious. We feel that the average person attending these sessions is about 90 per cent ready-to-wear-minded, and 10 per cent electrical-minded."

"He not only fails to keep in touch with the progress and methods we employ, but is even ignorant of the actual efficiency of the merchandise we sell and the progress the industry has made in meeting the needs of the American people."

"Therefore we feel that if he could run into a refrigerator or other electrical appliance everywhere he goes at the convention—in addition to being attracted by scientific stunts—it seems to me that we could make more department store men take an active interest in electrical appliances."

"I have asked Mr. Cameron of General Electric to bring on some of their House of Magic stunts, and plant them in various parts of the convention. I have also asked Mr. Lawson of Frigidaire to do the same thing with some of his Century of Progress displays."

"In other words, wherever the retailer turns he will be reminded of
(Concluded on Page 2, Column 3)

**Brown Co. Becomes
M-H Subsidiary**

PHILADELPHIA—Brown Instrument Co. of this city, manufacturer of control devices and recording instruments, has been consolidated with the Minneapolis-Honeywell Regulator Co., and will function independently as a subsidiary of Minneapolis-Honeywell.

The Brown Instrument Co.'s business has been exclusively in the industrial field and consists of a line of instruments for indicating, recording, and controlling temperatures, pressures, flows, liquid levels, carbon dioxide, speeds, etc.

Both companies are pioneers in the controls field, the Brown Instrument Co. having been established in 1860, while the Minneapolis-Honeywell Regulator Co. was organized in 1885.

Richard P. Brown will remain as president of the Brown Co., according to C. B. Sweatt, Minneapolis-Honeywell vice president in charge of sales.

More than 500 people are employed in the Philadelphia plant of the Brown Instrument Co., according to Mr. Sweatt.

**New G-E Dealership Is
Formed in Knoxville**

KNOXVILLE, Tenn.—The Electric Home Service Co. has been formed here with headquarters at 719 S. Gay St. as a dealer for General Electric appliances in Knoxville and distributor for automatic heating and air-conditioning equipment in eastern Tennessee.

J. S. Moye is manager of the enterprise, and J. W. Elmendorf, who had charge of the G-E exhibit at A Century of Progress, is in charge of the service department.

**Installation of Air Conditioners
Shows Big Gains During 1934
In Detroit & Kansas City**

By John T. Schaefer

DETROIT—The use of air conditioning was expanded to a very gratifying extent here during 1934, figures just compiled by the utility serving the Detroit area show. A total of 60 new air-conditioning systems using electric refrigeration were placed in service this past season, as compared with 40 for 1933.

The connected horsepower installed for air conditioning was 714½ this year, as against only 279 hp. in 1933, a gain of over 150 per cent. For the complete comparison of refrigerated air-conditioning systems installed (1) prior to 1933, (2) during 1933, (3) during 1934, and (4) total through 1934, see the tabulation on page 5.

These data do not include several ice type air-conditioning installations, nor several non-refrigerated systems which use deep well water for cooling effect, according to S. S. Sanford who released the figures from the Detroit Edison Co.

One of the most outstanding, and certainly the most publicized Detroit
(Concluded on Page 5, Column 4)

**Ludington to Head
Leonard District**

DETROIT—R. R. Ludington has been appointed district manager for Leonard Refrigerator Co.'s New York State territory, according to an announcement issued last week by Godfrey Strelinger, Leonard sales manager.

Mr. Ludington came to Leonard in January, 1931, after 10 years as a special factory representative for Rex Mfg. Co. Since July, 1932, he has been assistant to Mr. Strelinger.

He will be succeeded in this position by R. G. Nelson, Mr. Strelinger's statement said. For the past two years Mr. Nelson has been a member of the Leonard sales staff at the home office.

The territory placed under Mr. Ludington's supervision includes Buffalo, Rochester, Syracuse, Binghamton, and Albany, in addition to Pittsburgh, Pa., and Burlington, Vt.

**G-E Institute Holds
Birthday Party**

CLEVELAND—General Electric Institute at Nela Park here celebrated its first anniversary last Saturday afternoon, Dec. 22.

With Cleveland G-E officials and their friends in attendance at the institute auditorium, Owen D. Young, chairman of the board of General Electric Co., spoke over a direct wire from New York City.

At the conclusion of his message he pressed a button, turning on the spectacular Christmas decorative lighting of the buildings and grounds at Nela Park.

Mr. Young's talk was followed by talks by J. E. Kewley, vice president in charge of G-E's incandescent lamp
(Concluded on Page 10, Column 3)

**Wyllie Reports Improved
Market in West**

DETROIT—The market for beer cooling and wine cooling equipment on the West Coast is improving, John Wyllie, Jr., general sales manager of Temprite Products Corp., reported recently upon returning from a trip to the West Coast.

"Beer legislation has apparently been somewhat slower than in the east," Mr. Wyllie stated, "but is being rapidly settled and equipment can, and is now being sold."

**Patterson Entertains
Florida Dealers**

MIAMI, Fla.—George Patterson, head of George Patterson, Inc. of St. Petersburg, state distributor for General Electric refrigerators, acted as host to 125 southeastern Florida dealers, salesmen, and their friends at a dinner-dance held recently at the Cara Villa club.

The occasion celebrated the fact that in the recent national G-E sales contest, the southeastern district led the state.

By John T. Schaefer and
Phil B. Redeker

KANSAS CITY, Mo.—A total of 149 refrigerated air-conditioning installations were made and placed in operation during 1934 in Kansas City, Mo., according to data compiled by Albert L. Maillard of the air-conditioning division of the Kansas City Power & Light Co. here.

These figures do not cover installations in Kansas City, Kansas, adjoining twin city of the Missouri metropolis, Mr. Maillard points out. Nor do they include the yet-to-be-installed 1,000 ton York installation in the Municipal Auditorium (with some 2,000 connected horsepower), or a 200-hp. job installed but not yet started up in the Jackson County Courthouse.

It is immediately apparent that Kansas City enjoyed a very active season in air conditioning this year. In fact the city's 149 installations of 1934 exceed in number those for any city included in the survey of 1933 installations published in the 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK.

The 149 Kansas City installations reported for 1934 represent a power requirement of 1,029 hp., and have an aggregate refrigeration rating of 1,059½ tons of refrigeration per day.

The total refrigeration tonnage rating for 1934 exceeds the total horsepower requirement because one 300-ton steam ejector system was installed. Since steam is the prime source of energy in this type of system, the electric power load from these systems does not come up to the usual relationship of one horsepower per ton of refrigeration which holds approximately for the majority of electric compressor installations.

Mr. Maillard's data is furnished in two tabulations (see page 8). The first, Table I, is a summary of 1934 installations by makes of equipment and installation firm.

Table II is a list of all air-conditioning installations now operating in Kansas City—those made in 1934 plus those previously installed.

It will be noted that a greater number of installations was made in
(Concluded on Page 8, Column 4)

**Interpretation of Tax
Given Service Firms**

NEW YORK CITY—Offices and headquarters of the Master Refrigeration Association, Inc., of this city have been moved to 102 Fifth Ave., it was announced last week by E. S. Lape, secretary-treasurer.

At the regular meeting of the association held Dec. 14 at the Broadway Central hotel an explanation was made by legal counsel of the new
(Concluded on Page 10, Column 2)

**Utilities Ask Government Cooperation
In Testing Legality of TVA**

WASHINGTON, D. C.—Edison Electric Institute, in a memorial presented last week by its president Thomas N. McCarter, to President Roosevelt, asked that the government abandon its public ownership program and sought the cooperation of the government for a quick test of the constitutionality of the Tennessee Valley Authority.

The utilities promise to effect the reforms in financing which the President has criticized, and then in conclusion ask the government to join in a suit to test the constitutionality of the TVA.

Mr. McCarter, in the memorial, gave it as his own opinion that the government in the TVA experiment is exceeding its constitutional powers and infringing the sovereign rights of the state. He cited the joint opinion of Newton D. Baker, Democrat, and James M. Beck, Republican, that TVA is unconstitutional and the "similar conclusion" of United States Judge W. I. Grubb in a recent decision.

"I assume," says the memorial, "that there is no one more interested than the government in having finally settled as soon as possible the constitutionality or legality of projects upon

**Frigidaire Plans to
Build 500,000
Units in '35**

DAYTON—Frigidaire Corp. has retooled its two plants here and installed new machinery at a cost of \$1,600,000 to meet an anticipated sales volume of 500,000 units, E. G. Blechler, president and general manager, announced last Wednesday at a meeting of distributors, branch managers, and district sales managers from all parts of the United States and Canada.

"Rearrangement of several of our factory departments together with the new tools and dies required for the manufacture of our new line of products was carried through to completion only a few days ago," Mr. Blechler said. "Generally improved business conditions lead us to believe sales volume will rise in 1935."

"As buying power of the rank and file of the nation improves, betterment in the business activities of retail merchants will be registered and the demand for commercial refrigeration and air-conditioning products will increase in direct proportion as these retailers modernize their establishments and generally rehabilitate stores that have gone without improvements and new equipment for five years or longer."

"Analysis of reports from 44 sales district headquarters indicates that the trend upward that has been registered throughout 1934 will continue without faltering into and through 1935."

Following discussion of 1935 product, selling, and advertising plans, the Frigidaire field organization heads were conducted on a tour of inspection through the Taylor St. and Moraine City plants. One full shift is working in the Taylor St. plant and three full shifts are at work in the Moraine City plant.

**G-E Plans School on
Air Conditioning**

SCHENECTADY, N. Y.—A special sales engineering school, to be conducted at the Schenectady Works of the General Electric Co. during the four weeks from Jan. 14 to Feb. 9 has been announced to G-E air-conditioning dealers by the G-E Air Conditioning Institute.

Each dealer may send from one to six of his sales engineers to this school, where they will receive an intensive course of instruction in the theory and practice of air conditioning which will stress the product, its proper application, and its sales features rather than sales psychology and technique.

A comprehensive plan has been developed for the four weeks of the new sales engineering school. Men will enroll for the full four-weeks course. Sleeping quarters, meals, and study and recreation facilities will be provided. It will be necessary for
(Concluded on Page 10, Column 3)

**Grunow Dealers
To Sell 3 Lines
of Refrigerators****Federal Reserve Loan
To Help Company
Expand**

By George F. Taubeneck

CHICAGO—Next year three lines of Grunow refrigerators will be demonstrated to prospects by Grunow dealers: the Standard line, beginning at \$129.50 (delivered in the first zone) for a 4.8-cu. ft. box; the Deluxe line, beginning at \$169.50 (delivered in the first zone); and the Super Deluxe line, which ranges upward from \$265.

Practically unchanged is the Grunow carrene-using refrigerating unit, which is employed in all three lines. Styling of the Deluxe and Super Deluxe lines is identical with the distinctive design which has characterized Grunow boxes for the last two years—although two models of the Deluxe line do not have flush doors (otherwise they resemble the other models).

Conventional in design and distinguished only by a heavy black base, the Standard line has but two models, the 4.8 box mentioned above, and a 5.7-cu. ft. box retailing for \$169.50 delivered in the first zone. The "first zone" has been extended to cover more territory than it did last year.

Assurance that the General Household Utilities Co., manufacturer of Grunow refrigerators and radios, may continue on its present scale of operations—and even extend itself some—has come through the granting of a substantial Federal Reserve loan to the company.

Distributors of Grunow products met in Chicago Lake Shore Athletic Club last week to hear General Household Utilities stress the importance of getting better dealers for the 1935 race. They saw, in addition
(Concluded on Page 2, Column 1)

**C. I. T. Will Finance
Radio Sales**

CHICAGO—After a lapse of five years, the Commercial Investment Trust (known better as C. I. T.) is preparing to finance radio sales, according to Edward S. Brinsley, vice president of this time payment finance house, when interviewed here while he was attending the General Household Utilities convention.

This service will be immediately available to Grunow, Sparton, and other accounts which have been using C. I. T. service on refrigerator paper, and probably will be extended soon to other radio accounts.

For five years, according to Mr. Brinsley, the radio industry was in such a chaotic, cutthroat state that finance companies deemed it unwise to invest their funds in so unpromising a business.

Now, however, radio merchandising has become stable and profitable again, in the opinion of C. I. T. officials, and again merits financing service.

Mr. Brinsley declares that C. I. T. handled paper on more than 190,000 refrigerators in 1934. This number is expected to jump in 1935 in response to the new lower rates which C. I. T. is offering.

The new rate came in response to the pleas of dealers who were having to compete with department stores and utilities which have been financing their own time payment sales, and which have been offering low rates.

**Roskin Distributors to
Handle F-M Line**

CHICAGO—Roskin Distributors, Inc. of Boston has been appointed distributor for Fairbanks-Morse refrigerators, washing machines, and ironers, it was announced last week by M. W. Rosenfeld, eastern divisional manager of Fairbanks-Morse Home Appliances.

Roskin Distributors has branches in Albany, N. Y.; Middletown, N. Y.; and Worcester, Mass. Fifteen salesmen, under the direction of J. Abramson, field sales manager, are now covering the territory in a concentrated drive on the new Fairbanks-Morse refrigerator.

Grunow Dealers to Sell Three Lines

(Concluded from Page 1, Column 5)
to the complete lines of refrigerators, three new radio models.

A new 5-tube midget set to retail for \$34.50, a 5-tube skipband (American and foreign broadcast, both police bands, amateur and airplane broadcast) table set priced at \$44.50, and an 8-tube console with unusual tonal range listing at \$97.50 have been added to the present line of Grunow radios.

Safety will again be the theme of Grunow magazine and newspaper advertising. This year, instead of the familiar "It's Time America Knew What's Inside a Refrigerator," Advertising Manager Duane Wanamaker has devised this theme: "Find Out What's Inside the Coils" for Grunow refrigerator advertising. Another slogan which will appear prominently in General Household Utilities advertising during the coming year is "The Grunow ALONE is all you NEED."

Pictures of babies, nurses, and doctors appear in most of the advertisements. The "Handle-Smell-Apply a Match" test is also featured.

For the Grunow radio programs the Minneapolis Symphony orchestra has been reengaged, and the time Grunow has been using on a network of 41 CBS stations has been renewed.

This time Advertising Manager Wanamaker has a scoop, however. To the Minneapolis Symphony he has added Anne Campbell, Detroit newspaper poet, who is sometimes called "the female Eddie Guest." She will read her own heart-and-home poems over the air. It is her first chance at network broadcasting.

Appearing before the convention, the new Grunow radio star read some of her family-life heart throbs, and seemed to move the distributors profoundly with her recitations of the joys and tribulations of domesticity.

Radio listeners will be offered copies of Anne Campbell's Book of Poems if they will come into a Grunow dealer's store to claim them.

Speakers before the convention included H. C. Bonfig, vice president in charge of sales; Duane Wanamaker, advertising director; J. J. Davin, sales promotion and franchise department manager; Dr. J. D. Jordan, laboratory director; Lieut. Commander Fred H. Schnell, short wave radio engineer;

George Mason Eats a Hamburger



President George Mason of Kelvinator, who is a real scout as well as a highly successful and respected corporation president, bites into a Broilated hamburger sandwich and finds it good.

H. E. Kenney, chief engineer; Allen G. Messick, member of the executive committee; and Hays MacFarland, advertising agent for the company.

President Bill Grunow presented and demonstrated each product in the complete refrigerator and radio lines. Mr. Davin was in charge of the convention.

Six new—or comparatively new—distributors attended their first General Household Utilities convention. They represented the following organizations:

Pierce-Phelps, Philadelphia; Colen-Gruhn, New York City; Francis Stern, Hartford, Conn.; Howe & Co., Boston; Southern Equipment Co., San Antonio; Sheffield Co., Americus, Ga.

Edward S. Brinsley, vice president of the C.I.T. Corp., was present to present a new financing plan for dealers.

This new C.I.T. plan makes an adequate display stock available with a minimum immediate investment. A flat rate of 1 per cent is charged at first—plus an additional charge of 1/2 per cent per month for three months. The minimum charge is 1 1/2 per cent as compared with the customary \$2.00 per box. The dealer can renew three times for 30 days each at a cost of 1 per cent per month provided he reduces the unpaid balance by 10 per cent for each renewal. He is rebated 1/2 per cent per month or 1/60 per cent per day (down to the 1 1/2 per cent minimum) if he pays the balance ahead of time. The following table explains the plan:

Example of Floor Plan Transaction

Dealer's invoice price of refrigerator.....	\$100.00
Dealer's down payment of 20 per cent.....	20.00
Balance—amount to be financed.....	80.00
C. I. T. charge—including fire insurance.....	2.00
1 per cent flat.....	.80
1/2 per cent per month—3 months (1 1/2 per cent).....	1.20
Dealer's down payment plus finance charge.....	22.00
Balance—\$80.00—due in 90 days.....	

How Renewal Works

Balance due.....	\$ 80.00
Dealer reduces balance 10 per cent or.....	8.00
Balance now owed.....	72.00
Renewal finance charge.....	.72
1/2 per cent flat charge.....	.36
1/2 per cent per month—1 month.....	.36
10 per cent reduction of balance due, plus finance charge.....	8.72
Balance—\$72.00—due in 30 days—with two more renewals of 30 days each available if desired on same terms of 10 per cent reduction and renewal cost of 1/2 per cent plus 1/2 per cent each 30 days.....	

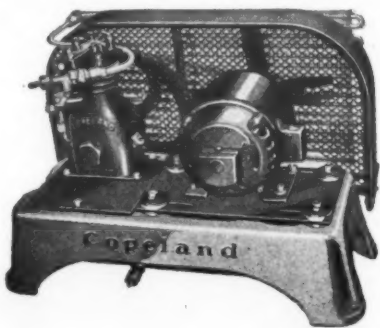
Rebates—A rebate on all unused financing is allowed under this plan, down to the new minimum of 1 1/2 per cent. For example, in the first part of the above example, the monthly rate for three months was 1 1/2 per cent. If the refrigerator is sold in 1 1/2 months, you are rebated half of the charge or 60 cents.

THIS WEEK COUNTS!

The week between Christmas and New Year provides time for reflection to enable business-men to chart their policies for the coming year.

Surveying the activities of 1934 undoubtedly discloses many missed opportunities for profit, one of the principal sources being often overlooked.

We refer to the business of Commercial Refrigeration, year-round producer of generous profits, knowing no "Rush" seasons, increasing in volume yearly with the general acceptance of Automatic Refrigeration as an integral part of our modern scheme of living.



An opportunity to engage in this business is offered at this time, in protected territories, to responsible, intelligent men desirous of cashing-in on the growing demand for efficient refrigeration.

Take advantage of the Holiday lull to investigate a Copeland franchise by writing today for full particulars.

Copeland units from 1/6 to 3 h.p., 21 distinct models, provide correct refrigeration for every purpose.

COPELAND REFRIGERATION CORP., Detroit, Mich.
Main Office and Factory: Holden at Lincoln Aves.
Division of DALLAS E. WINSLOW, Incorporated

Copeland
DEPENDABLE ELECTRIC REFRIGERATION

Grunow Specifications

General Household Utilities Co., Chicago, Ill.

Model No.	Standard		De Luxe				Super De Luxe		
	50-S	60-S	51-D	54-D	61-D	65-D	80-D	65-SD	80-SD
Overall Dimensions (in.)									
Height	52	56½	51	56½	57½	58½	62½	58½	62½
Width	24½	25½	24½	24½	24½	29½	31½	29½	31½
Depth	21½	21½	24	25½	26½	25½	25½	25½	25½
Storage Capacity									
Gross food storage (cu. ft.)...	5.18	6.12	5.53	6.9	6.51	7.2	8.74	7.2	8.74
Net food storage (cu. ft.)....	4.78	5.7	5.1	5.4	6.1	6.53	8.0	6.53	8.0
No. of shelves	3	4	4	4	5	5	5	5	5
Total shelf area (sq. ft.)....	8.53	11.28	10.4	10.34	13.66	13.96	15.67	13.96	15.67
Ice Cube Trays									
No. of trays	2	2	2	2	3	3	4	3	4
No. of cubes	64	96	96	84	128	112	140	112	140
Weight of cubes (lbs.).....	4.88	7.32	7.32	6.0	9.75	8.0	10.0	8.0	10.0
Thickness of Insulation (in.)									
Top	2½	2½	2	2½	2½	3	3	3	3
Sides	2½	2½	2	2½	2½	3	3	3	3
Bottom	2	2½	2½	2½	3	3	3	3	3
Motor size (hp.)	¼	½	¼	½	½	½	½	½	½
* * *									
Compressor			Finish						
Type of compressor.....			Rotary			Cabinet finish (exterior).....Dulux			
						Cabinet finish (interior).....Porcelain			
Motor			Control						
Type of motor.....			Capacitor			Type of refrigerant control.....Models			
Refrigerant			50-S, 60-S & 51-D—Carrene meter;						
Refrigerant used			Carrene			others—float			

Merchandising of Electrical Appliances Will Be Studied by Dry Goods Men

(Concluded from Page 1, Column 1)

the electrical industry. These displays are to be set up in addition to the regular exhibits of merchandise that the various manufacturers plan to set up in the main exhibition rooms.

Ralph C. Cameron of General Electric, Charles T. Lawson of Frigidaire, and V. E. Vining of Westinghouse—all managers of department store sales for their respective companies—are on the program. So is Wright Griffin of Rex Cole, Inc., New York City General Electric distributor.

As devised by Mr. Lutes, the program for the electrical sessions will probably be as follows:

Tuesday Afternoon, Jan. 15, 1935

H. Lutes, Chairman

Theme: What are the volume possibilities in electrical merchandising through department stores?

2:30 p. m. "Why stores have hesitated to add specialty operations and acquire a large additional volume."—Speaker to be announced.

3:00 p. m. "The present market available for department stores—its magnitude and enormous possibilities."—Ralph C. Cameron, General Electric Co.

3:30 p. m. "What is the most probable trend for the future in merchandising refrigeration?"—Charles T. Lawson, Frigidaire Corp.

4:00 p. m. "At present, what barriers confront the manufacturer who selects department stores as his outlet?"—V. E. Vining, Westinghouse Electric & Mfg. Co.

Open discussion.

Thursday Morning, Jan. 17, 1935

H. Lutes, Chairman

Theme: Fitting the specialty operation into the department store.

9:30 a. m. "Making the sales force effective—training, supervision, dem-

onstrations, leads, follow-ups, closing, remuneration of salespeople, etc."—Speaker to be announced.

10:00 a. m. "Methods of increasing gross margin—competition—private vs. national brands, trade-ins, specials, mark-up objectives, etc."—Speaker to be announced.

10:30 a. m. "Is outside selling desirable for department stores—are home demonstrations—is direct canvassing?"—Nelson P. Wright, May Co., Cleveland.

11:00 a. m. "Putting teeth in promotions—human interest displays, sales contests and prizes, aggressive publicity, showmanship, etc."—Speaker to be announced.

11:30 a. m. "How can department stores dominate the electrical merchandising picture?"—Julien Elfenbein, House Furnishing Review.

Open discussion.

Thursday Afternoon, Jan. 17, 1935

H. Lutes, Chairman

Theme: Electrical industry looks to department stores as outlets.

2:30 p. m. "Future department store operations in appliances vs. present factory branch direct sales operations. Are stores changing in their attitude towards appliances?"—Wright Griffin, Rex Cole, Inc.

3:00 p. m. "Is it sound business and good finance to sell refrigerators on the winter finance selling plan, or practically no down payments and very light instalments with long term paper?"—Representative of G.M.A.C., Redisco, or some similar financing authority.

3:30 p. m. Open discussion. Chairman will present the results of a recent questionnaire on electrical selling in stores, and then will follow detailed discussion on specialty appliance merchandising in general.

Utilities Seek Govt. Help in Test of TVA Legality

(Concluded from Page 1, Column 4)

billions of dollars by many millions of direct investors, and indirectly by many millions more through the ownership of the securities of these properties by life insurance companies, savings banks, stock fire insurance companies, and other corporations," the memorial continues.

"There is hardly any citizen of this country, possessing any qualities of thrift, who is not either directly or indirectly interested therein. The life insurance companies of the country hold approximately 1 billion 651 million dollars of the securities of these electric companies. The savings banks and trust companies hold 2 billion dollars.

"The companies composing this industry practically without exception are operating subject to thorough going regulation by state constituted tribunals. An overwhelming percentage of the business of the companies is intrastate as distinguished from interstate, under the definition of these respective kinds of commerce laid down by the Supreme court of the United States."

That electric power rates are unreasonably high, Mr. McCarter denies. They are regulated by state tribunals and they do not pay the cost of serving small consumers. Tax free public utilities financed by the government at low rates could, it is contended, furnish current at lower rates.

"Suppose all this to be true," says the memorial, "is it fair? Is it just to existing investment? Is it in keeping with the declared policy of the national recovery act to prevent unfair competition? Is it in the spirit of American fair play?"

The utilities pay a quarter of a billion dollars in taxes annually. Therefore, says the memorial, whatever saving in consumers' bills could be effected by public utilities "would be offset in whole or substantial part by an increase in taxation, which all citizens must bear, and the practical effect of which would be a subsidy to this undertaking, the cost of which would be borne by the nation at large."

There is now a power surplus, says the memorial, and full development of the projects of the government would create a surplus of from 150 to 200 per cent over anticipated requirements. The coal industry would be harder hit and the railroads would suffer loss of freight.

G-E Washers Will Be Made at Bridgeport

BRIDGEPORT, CONN.—All General Electric wringer-type washers will be manufactured at the G-E Bridgeport works, starting in February, 1935, it has been announced by officials of the General Electric Co.'s merchandise department, Bridgeport, Conn. This will centralize the production of practically the entire line of G-E home laundry equipment at Bridgeport.

McCORD REFRIGERATION PRODUCTS

COMMERCIAL EVAPORATORS

DOMESTIC EVAPORATORS

CONDENSERS

METLFLEX ICE TRAYS

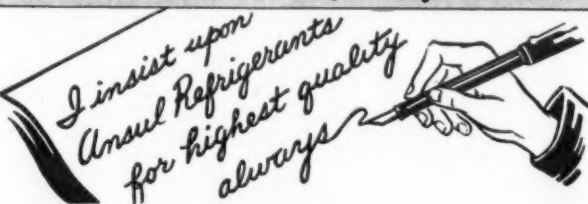
SPIRAL FINNED TUBING

SPIRAL COPPER FINNED IRON

STEEL OR COPPER PIPE

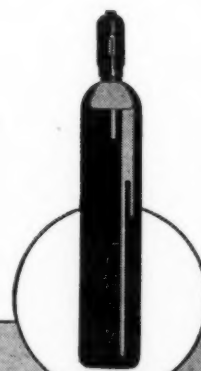
McCORD
RADIATOR &
MFG. CO.
DETROIT, MICH.

"Note to Refrigerant Buyers"



Ansul can make that statement without reservation. Before a cylinder of Ansul SULPHUR DIOXIDE or Ansul METHYL CHLORIDE leaves our plant it is given an individual analysis to make certain that the quality is such that it will render perfect refrigeration service. It's your assurance of absolute satisfaction.

ANSUL CHEMICAL COMPANY
MARINETTE WISCONSIN

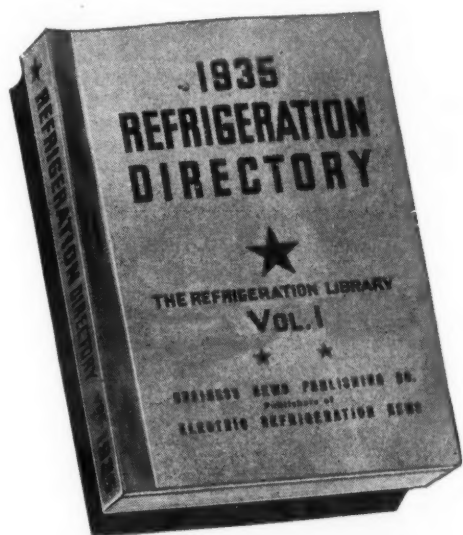




*"I'm going to them!
the best advantage of*

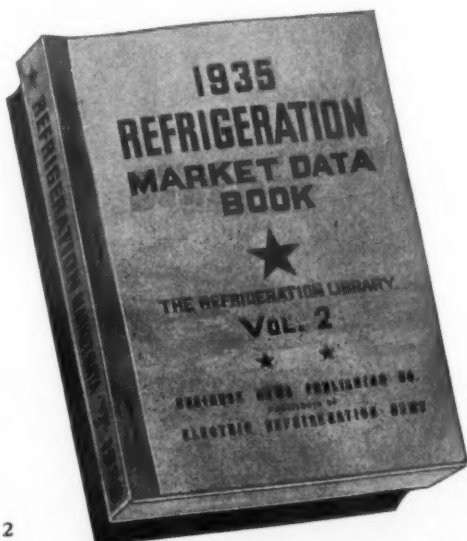
*Yes, I'm going where I can buy to
our company and our customers"*

The BUYER is TAKING THE AGGRESSIVE in the REFRIGERATION INDUSTRY



VOL. 1—1935 REFRIGERATION DIRECTORY

Recognized industry register of all trade-marked refrigeration and air-conditioning products. Four complete sections—(1) Alphabetic list of manufacturers; (2) Index of trade names; (3) Classified list of refrigeration equipment, parts and materials with all sources of supply; (4) Geographical directory giving name, address, telephone number, and products of manufacturers. Independent service companies and jobbers of supplies, parts, and materials included.



VOL. 2

1935 REFRIGERATION MARKET DATA BOOK
Veritable encyclopedia of information on refrigeration and air-conditioning industries. All known facts and figures recording development up to date. Systematically arranged and tabulated. Subdivision by territories and types of products for market and sales analysis. Included are household, commercial, and air-conditioning sales statistics—survey of distributive channels—merchandising activity—potential market and other essential data.

The buyer of electric refrigeration products is keen, alive, aggressive. He goes out after supply sources—takes the initiative—closes his contracts before a majority of other suppliers know he is in the market.

Sometimes this buyer is a distributor with a large dealer following. He is dissatisfied and his dealers are dissatisfied with his present line. He wants another company to supply him—and he is out looking for such a company. But he doesn't broadcast this news. That would hardly be politic.

Or perhaps this buyer is looking for sources of supply for replacement parts. So off he goes on a buying tour. It's important to him that he make the right selection.

Or again he may want some additional line to fill out his present one. Who are the best concerns to supply that line? He is going to find out.

In every case where does the buyer look first? Naturally in the REFRIGERATION DIRECTORY AND MARKET DATA BOOK, the official buyer's guide and recognized register of all trade-marked refrigeration products. He will find all possible sources properly listed under correct classifications. (This listing does not cost such concerns a penny.)

But will he start with a mere list of names or will he select the concerns which supplement their listing with an additional sales

message describing their product and giving him the information he needs? Ask yourself what you would do. Note your reactions when you look for a supply source in the classified pages of the Telephone Directory.

You should be represented by an advertisement in the REFRIGERATION DIRECTORY AND MARKET DATA BOOK. You need this advertisement. Your promotional efforts will be incomplete without it.

ADVERTISING RATES

and EXACT SIZES FOR TYPE MATTER

1 page (4 1/2 x 7 1/4 in.)	\$100 per page
2 pages	\$ 90 per page
4 pages	\$ 80 per page
8 pages	\$ 70 per page
12 pages	\$ 60 per page
16 pages	\$ 50 per page

Half page—

(Vertical 2 1/8 x 7 1/4 in.)	\$50
(Horizontal 4 1/2 x 3 1/2 in.)	\$50

Quarter page—

(Vertical 2 1/8 x 3 1/2 in.)	\$25
(Horizontal 4 1/2 x 1 3/4 in.)	\$25

Trim size of book is 6 1/4 x 8 3/4 in.

Rates on inserts, additional color, and preferred positions on application.

Advertising Forms Close Jan. 20, 1935

The 1935 REFRIGERATION DIRECTORY AND MARKET DATA BOOK—in two volumes—to be issued February 20, 1935—price \$5.00 per set postpaid in the United States. In combination with a year's subscription to ELECTRIC REFRIGERATION NEWS, \$6.50.

BUSINESS NEWS PUBLISHING CO.

5229 Cass Avenue - Detroit, Mich.

PERSONALITIES

By George F. Taubeneck

Farewell to Mat

A couple of years ago Mr. COCKRELL brought into this organization a big, good looking, two-fisted, powerful he-man named HOWARD MATTEER to become advertising manager of the Business News Publishing Co.

"Mat" came from the McGraw-Hill Co., where he had been one of their leading salesmen. He was a fraternity brother of Mr. Cockrell's at the University of Illinois, and later Mr. Cockrell gave "Mat" his first job with McGraw-Hill.

Just last week McGraw-Hill decided they had done without "Mat" long enough, dug down into the sock to bring up enough coin to make him an interesting proposition, and hired him back.

Among the chief mourners at Mat's departure was yours very truly. It was inspiring to have "Mat" around. His robust good spirits, the gusto with which he runs through his interesting life, and the fire he puts into things made working around the Business News Publishing Co. a more exciting and gay business when he was here.

We'll miss him. Plenty!

Ditto El Herron

And now comes a piece of news which sadden readers as much as it does us. EL HERRON, the best reporter of dealer news any trade paper ever had, is leaving us, too.

The sprightly El, who has so much talent that it runs out of his ears, has been lured away by the Owens-Illinois Glass Co., where he will do publicity work under our mutual friend MILT OLANDER, who was until recently assistant football coach at the University of Illinois.

This department feels especially bad about this parting, for we practically raised El from a pup. From the day El was pledged to the writer's college fraternity, we took a shine to the lad, and watched him and rooted for him from that day to this. Once, with a young doctor from Chicago, we fought with the whole fraternity—students and alumni—and convinced 'em all that El was right and they were wrong.

Between his junior and senior years El spent a summer up here in Detroit working for us, and did a bang-up job. Incidentally, he had a great time—his first experience in a big city.

Immediately upon his graduation he trekked back to Detroit, and at once became a mainstay of the organization. He could do practically anything around the paper, and do it well.

At first he was a sort of personal assistant of ours, and we spent practically all of our waking hours together (sleeping hours, too, for we lived together in a variety of places).

It wasn't long, though, before he

spread his wings and began his famous tours around the country gathering dealer news. Readers of this paper will have no difficulty recollecting the brilliancy and the timeliness of those reports.

While at the News El found himself a bride, lively GRACE SMILEY, who had been our receptionist. Grace likes nice things, and so does El, and so when MILT OLANDER—drat his grand soul—came along with an offer which had plenty of the de-re-mi attached, El couldn't resist the temptation to take it.

P. S. He has already placed his order for a 1935 Oldsmobile.

El Says Goodby

Before leaving, El wrote us a letter which was his farewell to the industry with which he had become acquainted so rapidly. And since it deals almost entirely with Personalities, it does very well right here.

Presenting a Swan Song:

Dear George:

I guess you learned before you tore out for Chicago that I'm leaving the News for a job in Toledo with the Owens-Illinois Glass Co. It's news work, and the Owens folks are a grand gang, but this business of leaving the paper isn't the easiest thing in the world.

I'll be gone before you get back, so I'm typing this note to ask a favor of you. I wish you'd say goodbye to some friends in the industry for me. Over the course of two years and eight months, I've put them in my own little Refrigeration Hall of Fame, elected them to the Gallery of Swell Guys.

Small matter who comes first, but I'm probably ought to ask a favor of you. I wish you'd say goodbye to some friends in the industry for me. Over the course of two years and eight months, I've put them in my own little Refrigeration Hall of Fame, elected them to the Gallery of Swell Guys.

Ring up GEORGE BRIGHT, too. He started calling me by my first name when I was still trying to find out who made the Monitor Top, acted as though I was just as important to him as some of the really big bugs he deals with. It's men like him who keep cub reporters from committing suicide.

And don't forget SYD CASWELL here in Detroit. He gave me the first story I ever wrote for this paper, showed me around his fine big G-E distributorship, and invited me back. I worked three hours to make his four-inch story a dandy. Syd's phone operator, KAY GUILFOYLE, was always a joy to me. She has a voice that would melt the heart of a purchasing agent, and I liked her plenty.

A big warm goodbye to LEONARD

and BOB TURNBULL, Detroit Grunow wholesalers. I always claimed they had the best distributorship in the country. It runs so darn smooth. And their business formula is so simple: Don't gyp anybody out of a nickel. Keep overhead down and sales up. And do they like the News!

I never knew him very well, but I wish you'd say so long to GEOFF JOHNSTON of Universal Cooler. I guess a little guy like me just naturally goes for a big brawny hulk like him, and it always tickled me no end when he went busting in the boss' office without knocking.

LOUIS RUTHENBURG was another right hombre. When he was smothered with work right after he took over the Servel presidency, I called on him in New York, and he shoved everything aside and talked for more than an hour, telling me about his plans. He was always so decent it never gripped me much when he asked that such-and-such not be printed. Whenever I walked into his office, I fully expected to hear him say, "It's a fine day—but don't quote me."

A big husky handshake for Norge's JOHN KNAPP. He's a funny one, George. When I was getting started here, he and I had more fights than the News has subscribers. I used to sit in Norge conventions and wonder why everybody clapped. I know now. He's hardboiled, but he's got a heart big as a rollator. There's nothing I wouldn't do for him—we haven't had a run-in for a year. Here's a tip. When he cusses you, cuss him right back. He likes that. I do think you're a little wrong about that Iron Man stuff, though, George. He's a worker, and he can take a lot of punishment, all right, but after a gruelling convention he doesn't even come down to the office, even as you and I.

Tell Mr. UNWIN of Copeland's advertising agency I've gone. If anything's ever been written, he knows all about it, because he's read every book in the library. But I bet he smokes himself to death. Those cigars of his are murderous. Bid adieu to Mr. WINSLOW of Dallas E. Winslow, Inc., too. Ours was just a telephone acquaintanceship, but it was pleasant.

And when you're in Atlanta, give my best to Distributors HARRY LEVER and HOP HOPKINS, the stoutest anti-TVA-ers I ever met. They're goldmines of information, and you can bank on nearly everything they tell you. But tell Harry he's a snake for sending that letter of condolence to my wife after he read about my marriage, and tell Hop all that chili sauce will ruin his stomach.

Best of luck to CHARLIE GIBSON in Greenville. He's the only fellow in the world who can wear a green suit and still look like a real executive. He and I had a lot of fun riding around in his motor boat a year or so ago. But he picked a hellish time to have his outdoor camp for distributors. I about froze.

I can't give a warm enough goodbye to three swell publicity men—Crosley's JIM BECKMAN, JIM IRWIN of Frigidaire, and FRED BOLLMEYER of G-E. Last time I sat across the table from Fred, I had to borrow streetcar fare back to the office. Yeah, you remember.

W. D. McELHINNY always acted, when I happened in on him, as though he would have died of grief in the next five minutes if I hadn't come around to see him. That guy's a salesman. If I had a big company making fly paper or school bells, I'd give him everything but my glasses to be sales manager. Hand him a gavel and something to pound on, and business is due for a 200 per cent increase.

If you're ever down in N'Orleans, buy a drink for GEORGE LEHLEITER, Norge distributor, and send me the bill. He's aces with me, and he's a first-rank showman. Many's the time I've seen him chasing around in the snow at a Detroit convention with only his suit coat on, when he had an overcoat and hat hidden in his hotel room. His is the most loyal dealer organization I've ever seen.

Say so long to the whole gang at Seeger up in St. Paul—WALTER SEEGER, JACK LEONARD, and H. H. WEBBER. They're sure white folks. They were going at peak capacity last time I was there, but they took time out to show me through the whole plant, then drove me downtown to help me cash a check. Mr. GREVE, their advertising man, is O.K., too, even if he did lam into me once. We understand each other now.

One man you ought to see more of is CHESTER LICHTENBERG, who heads up G-E refrigeration works in Fort Wayne. He told me once, "We never invite the press here, but we always welcome it." And boy, what a welcome! He almost gave me the plant.

Speaking of courtesy, give my love to capable Miss DESSAU of Melchior, Armstrong, Dessau in New York. She couldn't have developed the graciousness with which she does business. It must have been born in her. We had a fine visit in New York last summer.

Department store men are usually awful tough to get news out of, but there are three who won my undying affection when this reporter sent some questions their way. J. B. OGDEN of Hudson's in Detroit, L. S. TALBERT of Toledo's Lion Store, and President G. P. JACKSON of Smith-Bridgman in Flint.

STERLING SANFORD in the power sales division at the Detroit Edison Co. was another of my favorites. He knows more about Detroit air-conditioning installations than the fellows who sold the stuff. And friendly—why, he took a whole half day to iron out a mess that started when my pa-in-law thought he was overcharged for light. Pa was wrong, but Sterling knocked off a buck to sweeten him up.

I hate like the dickens to think I may never have any more dealings with BOB RICHARDS, HENDLEY BLACKMON, and LESLIE PAUL at Westinghouse. They can entertain 50 newspapermen at a crack, and make every reporter feel like he's the one they really love. And you ought to see the waffle outfit those boys sent Grace when we were married—along with sympathies for the mistake she made.

I hope you'll give my best to the busiest man at Kelvinator—GEORGE

WILCOCK. His bosses ought to sit behind his desk for a day and see all the things he takes care of. But there was always time for helping us with a story. I hate to leave him.

To Messrs. CROWE and BOTTENFIELD of the St. Louis Norge distributorship I'd like to give a real big goodbye. To step in their building was like a homecoming. The place was mine. They took care of the mail I'd had forwarded there, they left word with their receptionist that when the News boy came, he could peg rocks at the windows if he wanted to, I swam in lunch invitations, and the cup ranneth over.

It was the same way with SAM NIDES at R. Cooper Jr. in Chicago. His four telephones have been ringing steadily since 1928, but he always had time to dig up all the news I asked for, take me out to lunch at places I'd never seen, and (bless him!) he took me to the first big-league baseball game I'd ever seen. Another G-E man who was just as nice was ED SCHAEFER in Milwaukee. He introduced me to weiner schnitzel.

Don't ever go to Minneapolis without looking up Norgeman NED VESTAL. I said JOHN DRAKE would get to heaven. Well, Ned will be right alongside of him, and so will FRED SHAW and STAN TOBIN from Brooke, Smith & French, the Kelvinator agency. They'll probably stop to steal road signs on the way, but they'll get there.

I'll never forget the day I was in Kansas City, and went trudging from office to office, wondering why everything was locked up. Golly, it was hot! I almost died! After the fifth call, I remembered it was Memorial Day. But I was too fagged out even to be disgusted with myself. Brightest spot on that trip was my visit with G. W. WESTON, secretary of the electrical association. He sho' knows his stuff.

I wish you'd remember me to CLARENCE BIRDSEYE, too. I sat in his laboratory in Gloucester, almost in the ocean, one rainy afternoon a couple of years ago, and had my first meal of quick-frozen food. He's a capital fellow, and not a bit stuck-up over his invention.

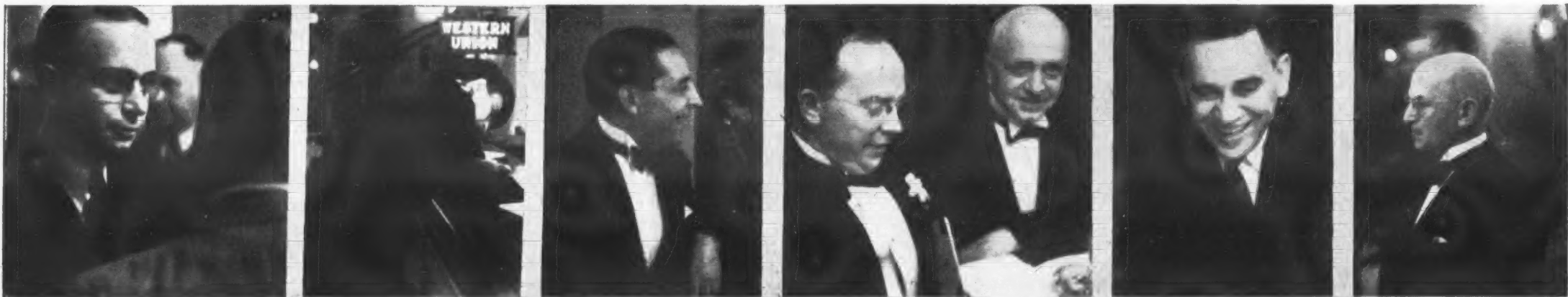
Four more, and I'm done. JIM STERLING and GLENN O'HARRA at Norge, and JERRY STEDMAN and CORY FAUDE of Cramer-Krasselt. And tell them not to work so darn hard. There's just no sense to the hours they put in, I don't care how many refrigerators there are to sell.

And, oh yes, HARVEY LINDSAY of Dry-Zero. He's all right. Rich in experience, gentle of manner, brilliant of mind, and with about the best sense of humor in the industry. I hope I see him again some day.

This is too long, George, but I had so much to say. Even now, there are a hundred more I'd like to mention. Including yourself. It's been real fun working with all the boys and with Mr. COCKRELL. He's taught me an awful lot. All I have to say that when better ideas are hatched, FMC will hatch 'em.

I'm leaving this letter with your sec'y. If I left it on your desk, you'd never find it. Merry Christmas. EL.

The Keyhole Camera Records Its Impressions of a Convention



(1) C. L. Fosatti, Norge export man. (2) Wiring the Little Woman that all is O.K. and that he is just going to bed. (3) A. E. Bottenfield from St. Louis. (4) President Howard Blood and French Nestor, leading distributor for 1934. (5) Dave Trilling of Philadelphia thinks life is just a bowl of cherries, while (6) Distributor Ludwig Hommel of Pittsburgh looks quite determined.



(1) Harry Hopkins of Atlanta, Norge distributor who has been one of the most militant foes of the TVA. (2 and 3) Gerry Stedman enlists the aid of Larry Wray in getting a troublesome bow tie. (4) Gerry says: "Nuts! I'll do it myself." So he takes off his vest and goes to it. All these pictures were taken at the recent Norge convention which was held in Detroit.

AIR CONDITIONING

Salem, N. J. Electric Firm Installs Heat Pump Conditioning System

SCHENECTADY—Reversible air-conditioning equipment, which may be adapted to either heating or cooling, depending on the season, is now in operation in the new building of the Atlantic City Electric Co. at Salem, N. J., according to engineers of the General Electric Co.

General Electric and American Gas & Electric engineers installed the equipment, which is the reversible-cycle refrigerating type, commonly known to engineers as a heat pump.

Reversing the cycle of the ordinary household refrigerator, electrically driven compressors absorb heat from a low-temperature source, raise it to a higher level of temperature by mechanical compression of the refrigerant gas, and discharge it at high enough temperature to heat the building in cold weather.

Process Reversed in Summer

In the summer the process is reversed. Both heat and moisture are withdrawn from the air of the building, and the heat is raised by the compressor to a high enough temperature level to be dissipated outside.

Outside air, the engineers point out, has an unlimited supply of heat even when the temperature is zero, but it is not ordinarily available. The heat pump is essentially a device in which heat at a low temperature is absorbed and raised to a high temperature at which it can be utilized.

The total heat made available by this means is not only that represented by the work of the compressor but also the heat from the outside

source. Thus it is possible for an expenditure in electrical energy equivalent to 100 heat units to obtain a total of 400 or 500 heat units for heating, an efficient use of electricity.

Although installations of this general type have already been made, most of them have depended on outdoor air as the heat source. These have had the lowest heating capacity in winter, when maximum capacity was needed.

Well of Water Used

At Salem, the heat is drawn from a well of water readily available which maintains a natural temperature of at least 56° F. in the coldest weather. Hence the equipment is able to deliver its maximum capacity without regard to outdoor weather conditions.

The heat is transferred from the water to the refrigerant in a large water cooler, the water leaving the cooler at about 40° F. In the compression cycle, the temperature of the refrigerant is raised to 135° F. and gives up its heat to the air within the building by passing through a condenser over which the air is circulating.

In summer, this condenser will act as a cooling surface to cool and dehumidify the air, and the heat thus absorbed will be dissipated by the water cooler, which may then serve as a water heater.

Humidifiers for winter use, air filters, and a high velocity fan and air circulating system complete the air-conditioning apparatus, maintaining

close automatic control of both temperature and humidity within the building summer and winter.

The engineers have introduced several new features to increase the maximum economy of operation. Four small compressors, rather than a single large unit, comprise the heat pumps. These will be started and stopped automatically in accordance with the outdoor temperature—which provides a fair index of the heating requirements of the building.

This arrangement permits some of the units to be shut down in relatively mild spring and fall weather, while the rest may operate at maximum efficiency. Further refinements in temperature control will be obtained by operating the units intermittently in accordance with the indication of an indoor thermostat.

It is anticipated that in most severe weather an electrical input of approximately 20 kilowatts for the driving motor will produce a heat delivery to the building equal to about 70 kw. expended indirect electric heaters.

The building in which this equipment is installed in a two-story-and-basement brick-and-steel reinforced concrete structure, well insulated and of modern design. Engineering and planning for the project was done jointly by the two companies, and the equipment was built and installed by General Electric.

While unwilling to claim the development revolutionary, G-E engineers point out that if performances bear out predictions, it will have a stimulating effect on the development of electric heating and air conditioning, not only by reducing the amount of electricity required but in making it possible to use the same equipment for heating and cooling.

Wiswell Is Exclusive Leonard Distributor

CHICAGO—The L. C. Wiswell Co. of this city has become exclusive Leonard refrigerator distributor for the Chicago area. The territory allotted to the organization is Chicago and Cook county, northern Illinois, and northern Indiana.

Detroit Air-Conditioning Installations

Type of Establishment	Prior to 1933 No.	Hp.	During 1933 No.	Hp.	During 1934 No.	Hp.	Total Thru 1934 No.	Hp.
Offices	14	39	14	49½	12	39	40	187½
Office Buildings	2	960	...	...	...	...	2	960
Restaurants	13	306	3	60	6	109	22	475
Hotels	5	712	1	10	1	20	7	742
Residences	10	41½	6	12½	12	18	28	72
Department Stores	3	3,353	...	...	1	50	4	3,383
Hospitals	1	60	...	...	...	...	1	60
25¢ to \$1 Stores	1	40	...	...	1	120	2	160
Furniture Store	1	12	...	...	...	...	1	12
Radio Station	...	1	1½	...	...	...	1	1½
Candy Stores	3	11½	2	15	2	42½	7	69
Drug Stores	...	3	47½	2	9½	5	57	57
Jewelry Stores	1	1½	2	16	2	22½	5	40
Beauty Parlors	...	1	5	1	5	2	2	10
Clothing Stores	1	3	2	15	8	96	11	114
Miscellaneous Stores	1	20	...	...	...	...	1	20
Electric Co. Sales Offices	2	34	...	...	1	7½	3	41½
Theaters	14	3,630	2	40	1	45	17	3,715
Banks	3	600	...	...	...	...	3	600
Stock Exchange	1	50	...	...	...	...	1	50
Broker's Room	1	75	...	...	...	...	1	75
Barber Shop	1	30	...	...	...	...	1	30
Laboratories	2	53	...	...	...	...	2	53
Drug Manufacturing	1	575	...	...	1	6	2	581
Candy Manufacturing	...	1	1	1	8¼	2	9¼	9¼
Undertaking Parlors	1	3	2	6	2	25	5	34
Night Clubs	...	...	...	...	2	25	2	25
Opticians	...	...	...	...	2	2	2	2
Library	...	...	...	...	1	4	1	4
Printing	...	...	...	...	1	20	1	20
Totals	82	10,609½	40	279	60	714¼	182	11,602¾

Conditioning Sales Gain in Detroit

(Concluded from Page 1, Column 2) installation of the year is not covered by the Detroit Edison tabulation—the large steam ejector system installed by Westinghouse to cool some 50 guest rooms in the Hotel Statler and several of the public shops etc. on the main floor. This installation has been augmented just recently by cooling additional guest rooms with Chrysler air-conditioning cabinets.

Biggest gain in air conditioning here were in retail stores and offices. Clothing stores, drug stores, a 5-and-10 cent store, and several other types of retail stores are rapidly recognizing

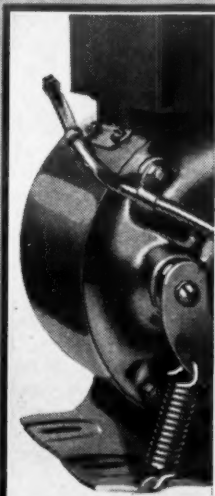
the advantages of air conditioning, it appears.

Six restaurants report new systems with a total of 109 hp. load, 12 offices drawing 99 hp. all together, and two night clubs, two undertaking parlors, and two opticians are among the new users of air conditioning. Twelve homes have been provided with systems this year, as against 16 which were operating at the start of 1934.

Average size of 1934 installations is about 12 hp., while last year it was 8 hp. Reason for this increase in average size is evident from noting that the table lists several fair-sized installations and relatively few 1 or 2 hp. jobs. Had there been any new construction of theaters or office buildings requiring air conditioning in Detroit this year, the average size of equipment would have been larger.

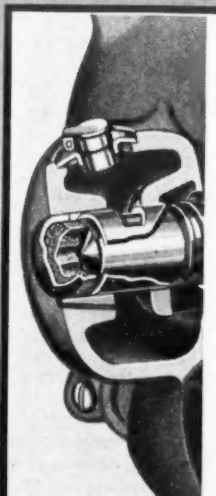
For Quietness and Dependability Specify Delco Motors

In no other electric appliance are quietness and dependability so essential as in the household refrigerator. The refrigerator motor must function silently and surely—day and night, year after year. Delco motors do this—because of their advanced design and precision workmanship, and because they possess the four famous Delco features shown below.



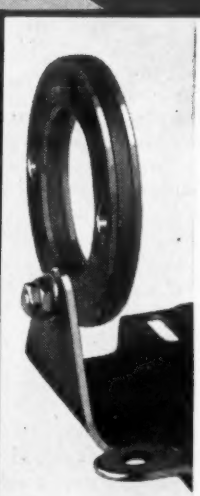
1

Automatic Belt Tightener—Delco electric refrigerator motors are now available with this new automatic belt tightener—a device which assures maintenance of proper tension on the belt at all times, thus compensating for belt stretch. This is just one of the features that add to the value of Delco motors.



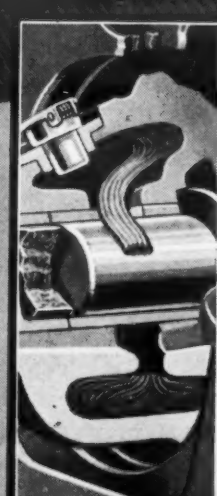
2

End-Play Take-Up—Delco motors are entirely free from end-play noise. All horizontal movement of the rotor shaft is effectively stopped by the cushioning action of a cork bumper. Adjustment is never necessary—because the cork is properly lubricated at the factory, and wear is negligible.



3

Vulcanized Rubber Cradle Mounting—The rubber ring is vulcanized between the steel plates, and effectively absorbs all the objectionable motor vibration, resulting in a quiet installation. The rubber is held permanently in place by being vulcanized to both plates.



4

Sealed Lubrication—This appreciated feature of Delco motors prevents motor over-oiling, by returning excess oil to a reservoir. This, in turn, stops any oil from getting on the windings. Delco Sealed Lubrication keeps the oil in the motor during shipment—installation—and its years of operation.

DELCO PRODUCTS CORPORATION, DAYTON, OHIO

ELECTRIC REFRIGERATION NEWS

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Getting Dealers

DUANE WANAMAKER, who is credited with having made more money as an advertising manager than anybody else in the industry today, made public a remark recently which might be branded as heresy by the advertising profession.

"Give me good and loyal dealers working hard to sell my product," declared the canny advertising manager of General Household Utilities, "and you can have all the national advertising you want. A good dealer can do twice or three times as well with a non-advertised product in his locality as a mediocre dealer can do with a product which has the backing of regular pages in the leading national magazines."

To illustrate his thesis, Mr. Wanamaker tells a little story about himself. It seems that he decided to paint a few gables on his house. He went down to the hardware dealer in his suburban community, and placed a substantial order for the best-advertised and best-known brand of paint.

"Well, I can sell you Blank Paint, Mr. Wanamaker," said the dealer. "I have plenty of it right here in stock. But you have a nice home out there. It deserves good paint. Now here is a paint which will wear much longer, and has truer colors. It will cost you more money. But its worth it. You've done business with me for a long time, and you know I wouldn't steer you wrong."

He made the sale.

Confidence in Dealer Most Important

"I'm an advertising man," points out Mr. Wanamaker, "and I have confidence in products which are advertised. But important as that may have been to me, it didn't weigh so strongly *even in my mind* as did confidence in my local dealer—who was thus able to sell me a paint of which I had never heard."

It should be noted that Mr. Wanamaker is not trying to cover up a deficiency in his own national advertising by decrying it. In his days as advertising manager of Majestic he out-advertised the field. Grunow national advertising, placed under his direction, has been in evidence this last year. Next year Grunow will have a page every other week in the *Saturday Evening Post*.

The point is that out of many years of merchandising experience, Mr. Wanamaker has learned *contrary to his own inclinations* that good dealers are vastly more important than an avalanche of national advertising.

So it is that the theme of the General Household Utilities convention last week in Chicago was "Get Good Dealers for 1935."

Thorough coverage, it was pointed out, is not enough. The sales manager who can point with pride to a large map of the United States dotted with thousands of pins locating his dealers has no right to sit back and congratulate himself. True, the business may roll in—but if the sales manager will study the orders, he may find something surprising. A *heavy proportion of all the orders will come from a relatively few dealers*.

Analyzing figures furnished by six of the largest manufacturers in the industry, editors

of the 1932 REFRIGERATION DIRECTORY AND MARKET DATA BOOK found that 3.7 per cent of the industry's total number of dealers made 50.7 per cent of the sales; that 14.7 per cent of the remaining dealers made 29.9 per cent of the sales; and that 5,600 good dealers made 80 per cent of all household refrigerator sales, while 25,300 not-so-good dealers accounted for only 20 per cent of all sales.

Since that date the number of dealers has contracted, and the percentage of business done by the remarkable few has increased, according to sales managers of a number of the leading manufacturers. Today as never before it is true that to get a place in the sun a refrigeration manufacturer must have his share of the good dealers.

Indications are that this year will produce a battle royal among field men to line up the proven dealers. That probably means that multiple dealerships—one good dealer handling several makes—will increase. It probably means that department stores will become more important. It surely means that *extensive* coverage will not be the fetish it once was; that *intensive* cultivation of the dealers who really do a job on refrigeration will be the important task at hand.

Manufacturers Scrutinizing Dealer Lists

As never before manufacturers are scrutinizing the dealer lists of their distributors. No longer is it enough to have 500 dealers—or whatever number may be adequate for the territory the distributor serves. No longer will jobbers be permitted to hand over a refrigeration franchise to a dealer simply because he is a good outlet for tires, or batteries, or washing machines, and the distributor doesn't want to offend him by refusing to give him the opportunity for a little extra rake-off on the sale of a few refrigerators. In 1935 manufacturers are going to insist that the dealers who represent their line be *worthy dealers*. One poor dealer in a town can make it awfully tough later on for the good dealer who tries to follow him.

By this time the nation is pretty well combed for dealers. Almost every retailer or merchant who could possibly be considered material for a refrigeration dealership has had his chance at one. The good dealers are becoming well known. And it is to them that the industry is looking in 1935.

A good product? Imperative. A sound merchandising program? Of course. National and local advertising? To be sure. But good dealers! That's the most important of all.

WHAT OTHERS SAY

Fact Are at Issue

PRESIDENT THOMAS M. McCARTER of the Edison Electric Institute, says he has obtained and intends to act upon a weighty legal opinion questioning the constitutionality of the TVA act and the legality of some of the things being done on the strength of that law.

This opinion, which Mr. McCarter purposes placing before President Roosevelt, and which, he intimates, may be made the occasion for a court test, is the joint work of Newton D. Baker, Secretary of War under President Wilson, and James M. Beck, former solicitor general of the United States and an authority on Constitutional law.

The document is said to assert in substance "that the legislation relating to this (TVA) project, and the plan of governmental action set up therein are palpably unconstitutional; that the legislation, if valid, does not authorize much that has either been done by the authority or that it is preparing to do, which is therefore illegal; and that cooperative actions of the Tennessee Valley Authority and the Public Works Administration forcing sales of property of private utilities under threats of gifts and loans to municipalities are illegal."

Such an opinion from two outstanding legal lights naturally is displeasing and disconcerting to men engaged in what they consider a great governmental and humanitarian endeavor. And it may be assumed that the document will not be precisely cheered at the White House which is deeply interested in the TVA, President Roosevelt having recently created a cross current to his own acts of rapprochement with private business by prophesying that the TVA ideas and program will soon be extended widely throughout the United States.

But the questions raised by Messrs. Baker and Beck are not questions to be settled by passionate denunciations or by ascribing wicked motives or by talking about "politics."

These questions are questions of law and of fact that ought to be examined dispassionately on their merits with a view to arriving at the truth and finding out how much legal strength or frailty the TVA act and practices actually have.

It is important also that this be done soon, for very large sums of public money are involved and so are the holdings of scores of thousands of stockholders in utility enterprises.—*Detroit Free Press*.

LETTERS

Going Miniature?

Bruno-New York, Inc.
460 W. 34th St., New York City
Dec. 13, 1934.

Editor:

Is the refrigeration industry going miniature minded? I am referring to TVA models and what have you.

America has had its miniature golf courses, miniature automobiles, miniature radios—and now, we are threatened with miniature refrigerators.

If the industry will take for granted that the American housewife is interested in midget refrigerators and continues to widely advertise and make them available, then the American housewife will become "midget conscious."

This trend will, naturally, prove a great boon for miniature sales, miniature business, miniature salaries, and miniature employment in the electric refrigeration industry.

Let's not make the same mistake that the radio industry made. They have had very bitter experience with midget radios and ridiculously low prices. The radio industry is now seeing the light and is "selling up," but it seems that in our industry we are beginning to "sell down."

As unit sales lower, the number of sales must increase. What happens? The dealer selling more refrigerators than he sold last year and who feels that he is being benefitted by lower priced units, should study his costs of service, delivery, and other fixed costs. The dealer costs show conclusively that the dealer cannot make money on refrigerator unit sales much lower than \$150. If any dealer has been wondering why he has been losing money, this will indicate to him one leak to plug up to stop part of his losses.

The real danger to both manufacturer and dealer is, that the minute the manufacturer comes out with a real low-priced refrigerator, sales are temporarily stimulated on that model, then the dealer's organization is pulled into the atmosphere of low-priced sales from which it is very difficult to pull back. Then, too, the encouragement of the sale of undersized, inadequate equipment will do more to destroy our own market than anything else.

I say, if we have discovered an appendix in our industry, let's cut it out. If we fail to cut it out, it will sap the vitality (profits) out of our business. The removal of this appendix will stimulate your business system and again assure you of high unit sales. The concentration on higher unit sales will build your business rather than destroy it.

Let's not lock the stable door after the horse has run away. Rather a futile procedure, isn't it? It is not too late for proper action—let's be sensible.

HAROLD A. GLASSER, Manager,
Refrigeration Division.

Credit Where Its Due

Kelvinator Corp.
Detroit
Dec. 17, 1934.

Editor:

Please refer to the article on page 12 of the Dec. 12, 1934, issue of *ELECTRIC REFRIGERATION NEWS* which is entitled "Askin Tells How to Compute Heat Loads." In this article the statement is made that Joe Askin, chief engineer of the Fedders Mfg. Co. has devised a short cut method of computing the heat load on a commercial refrigeration cabinet.

We would like to draw your attention to the fact that this method of computing heat loads was originated by Kelvinator and has been used continuously by them since November, 1929.

There is a difference, however, between the tables published in the article referred to above and the tables used by Kelvinator. The former reduce the figures for wall leakage and service load to a square foot and cubic foot basis, respectively, whereas Kelvinator's tables show these values already worked out for areas up to 700 sq. ft. and interior volumes up to 1,350 cu. ft.

This however, is merely a matter of arithmetic and does not affect the basic method of load computation in any way.

It is true that Kelvinator does not divide the daily heat load by 300 to determine the amount of cooling unit surface required because this figure of 300 depends upon the "K" factor of the cooling unit under consideration and the difference in temperature between the air in the refrigerator and the refrigerant in the cooling unit. Kelvinator cooling units are rated on a B.t.u. basis and can be matched exactly with the daily load.

We are bringing this to your attention in the belief that you will be interested in giving credit where credit is due.

W. E. WATSON, Assistant Manager
Commercial Applications Dept.

Editorial Reprinted by Chicago Tribune

The "Dry-Kold" Refrigerator Co.
Niles, Mich.
Dec. 21, 1934.

Publisher:

Permit me to congratulate you upon the editorial, "Asking Too Much," which appeared in the Dec. 5 issue of *ELECTRIC REFRIGERATION NEWS*, and which was copied last Sunday by the *Chicago Tribune*. You have handled this subject in a very fine manner and I am glad you make reference to the administration's advisers as "so-called" experts. You know people of the callow and inexperienced type these college professors are have to be carefully dealt with because anything they can distort into approbation they take seriously and it is like feeding animals raw meat. For instance, the term "Brain Trust" was first applied in derision but there is no doubt that these gentlemen have come to believe they have a corner on brains. Even a reference to them as brilliant theorists will aggravate their egotism, as they will bask in the joy of what is meant by brilliant, overlooking completely the theorist part of it. My own opinion is that these men are neither brainy nor brilliant as everything they have advocated up to date has been a failure and I can see no reason why we should feed their vanity in order to ease the shock for them. Another term which makes me want to kill is one these professors delight in and that is intelligentsia. When you think it all over, how absurd!

Anyway, Mr. Cockrell, I think the country is waking up and articles like yours will help a whole lot. I am sorry to see the continued references to over-whelming approval of the New Deal because after all there were 43 million Republican votes cast in the last election and this without any reorganization of the Republican party or any change in leadership. I believe 43 million people realize that the Republican party just as it is and has been for years is the party which has dug this country out of the hole everytime it has found itself submerged by fads and fallacies. I believe it is fair to assume that the party just as it stands can do this again and if it is reorganized too much with an injection of too much new leadership it will be no better than the party in power at the present time.

W. C. WHITCHER, President.

Free Service

Hotel Bolton
Cleveland, Ohio

Editor:

Would like for you to write me as to any information that you may have that is for the public in regards to the Copeland, Trupar, and Zerozone merger with new headquarters in Detroit.

Also can you inform the writer as to the possibility of the Mayflower electric refrigerator's future.

WESLEY SMITH.

Answer: Full information regarding the activities of Copeland, Trupar, and Zerozone has been published in *ELECTRIC REFRIGERATION NEWS*. If you have any serious interest in the refrigeration industry, we should think that you would subscribe to the *News* in order to keep informed regarding matters of this kind. We provide this service at a very nominal cost (\$3 per year) and any regular reader of the paper should have no difficulty in getting a clear picture of the company in question.

Very frankly, we have discovered no way whereby we could furnish such a service in the form of personally written letters. Certainly we would not attempt to give inside information *gratis* to a non-subscriber. Any information which we may have "that is for the public" is published in the *News*. If we had any confidential information it would be kept confidential.

It would not be fair to say that we print everything that we know. Certainly we do not print everything we hear. We are very wary about predicting what is *going to happen* in the future. We find that it keeps us quite busy reporting what has happened.

Master Service Manual

Connecticut Department of Education
State Trade School
Bridgeport, Conn.

Editor:

Kindly advise when the Master Service Manual will be on sale, also the cost of same.

We desire this material for instructional purposes in our new air conditioning and refrigeration classes.

PHILIP SMITH.

Answer: We are actively working on plans for the Master Service Manual, but at the present time we cannot make a definite announcement regarding it.

Right now we are concentrating upon the 1935 edition of the *REFRIGERATION DIRECTORY AND MARKET DATA BOOK*, which we expect to issue on or about Feb. 20, 1935. We hope to bring out the proposed manual soon after the *DIRECTORY* is completed.

AIR-CONDITIONING

Economics of Comfort Cooling Discussed by Mersfelder

By J. W. Mersfelder*

Manager, Air Conditioning Division, New York Branch, Frigidaire Corp.

THE economics of anything is dry material as a rule, but the economic value of air conditioning will be one of the most important considerations in determining the expenditure of many millions of dollars on modernization and new construction work during the years to come, most of it involving architectural planning. One might go far to find a group with greater understanding of winter air conditioning than architects and consulting engineers, even though it has not in the past been called by the new name.

There is no need to talk of the economics of heating, and what may be said of controlled humidity, cleanliness and circulation in one season follows closely for the other season. It is generally known that most of the summer air-conditioning units have been built to include those winter functions. Therefore we shall consider only summer air conditioning, as applied to commercial, residential, and industrial work.

The New Industrial Giant

Our thought is of the new industrial giant. It is a basic industry, mining new ores, requiring new raw materials, employing new labor, training new skill and displacing nothing. It is generally looked upon as one of the forces that will lead us back through the present economic disturbance. History shows that something basic like this has developed in the rise out of past depressions.

The college training for the air-conditioning engineer of the future must take from the books of refrigeration, ventilation, electrical, chemical, civil, and sales engineering. He must know considerable of the physiological effect of air conditioning because of its effect on hay fever, pneumonia, cardiac, and many other disorders. He must study the technique of industrial process. Many products could scarcely be produced without treated air.

General Market

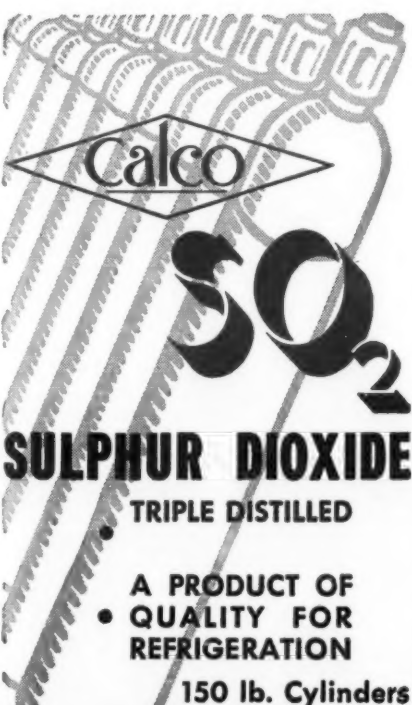
Prices vary because of the variety of types of concerns entering the field, and will probably continue to do so until the market more or less dictates a greater measure of uniformity in that regard.

Andre Merle in the *Wall Street Journal* states: "The downward trend of prices is apt to be slow. Much larger sales volume will probably be required to permit substantial reduction in manufacturing and selling costs."

To that can be added the thought that the manufacturers as a rule are those already producing refrigerating equipment of similar size on a quantity production basis. Accordingly, no abrupt downward price revision can be expected.

The percentage spread of the business volume for various concerns in the line will vary because of their

*Address delivered under the auspices of the Power Division, Industry Program Committee, Electrical Association of New York, Inc., at its Electrical Institute, Grand Central Palace, New York City, Sept. 14, 1934, to an audience comprising the architectural profession of the New York metropolitan area.



Calco
SO₂
SULPHUR DIOXIDE
TRIPLE DISTILLED
A PRODUCT OF
QUALITY FOR
REFRIGERATION
150 lb. Cylinders

THE
CALCO CHEMICAL COMPANY
INCORPORATED
BOUND BROOK • NEW JERSEY
BOSTON • PHILA. • NEW YORK • CHARLOTTE • CHICAGO
A Division of American Cyanamid Company
PACIFIC COAST REPRESENTATIVE
FRANKLIN G. SLAGEL
LOS ANGELES • SAN FRANCISCO • SEATTLE

sales set-up. Our experience in this past year has been

31% in homes
39% in offices
22% in businesses
8% in processing

This is purely local retail and does not include a very large volume of railway car work.

A Basic Need

While we are primarily interested in this subject for its economic necessity, consider for a moment that the human body needs, every day, to sustain life:

4 lbs. of clean water
3 lbs. of good food
32 lbs. of proper air

That will bring out that a great, basic human need is the foundation for the public demand. A great industry cannot thrive healthfully on a luxury.

Economic Position of Air Conditioning

There is nothing new about air conditioning—it is a natural evolution. Only the application of available equipment is new and the problems of application are countless and ever-changing.

What might be called for the purposes of size comparison, "wholesale comfort cooling" has been available and has been used in theaters and manufacturing plants for many decades, but now the man on the street takes recognition of "retail comfort cooling" for his home, office, or moderate size place of business.

Economically, this "retail" business fits into the market in identically the relative position that moderate size refrigerating units fitted in the commercial refrigeration market some years ago.

Then, one could always have a large and expensive plant, but price and other factors militated against the entry, to any great extent, of that type of equipment down into the strata of the greatest need and greatest dollar volume. I mean by that, the market of the home kitchen, the ice cream cabinet, the butcher shop, restaurant, food shop, water cooler, and other markets.

Much the same sort of a manufacturing, installation, and service set-up will be required to take care of this new demand except that we must rely to a very marked extent on the co-operation and understanding of the architect and consulting engineer in order that the public may best be served.

Plan Selection by the Purchaser

It is to be regretted that the public will so often insist on making a selection for themselves, a choice they are usually no more trained to make than how to turn a barn into a country home or how to put an elevator into a walk-up apartment.

The prospect is not at all aware of the danger to him of the system of inviting "blind bids" on his requirements. He has no idea of the architectural or mechanical specifications of the right system for his conditions. He knows only that he wants results under the mysterious caption "air conditioning."

He is much like a man who invites a number of contractors to bid on "a house," approximate price and architecture unstated, then because of economic stress, makes selection on price. We all know what can happen to him.

Stability of the Contractor

Service was mentioned and it might be pointed out, on that score, that jobs are planned (or should be) to last while the building lasts, also that the new industry will attract the usual quota of opportunists who will have much to learn of what the future holds for them.

A full measure of security as to stock and service should be, after proper engineering, the most important factor in the selection of the contractor.

Air conditioning will be needed some day in practically every indoor area. It is our conviction that it should either be installed or included in the plans in order not to have the new structure obsolete almost as soon as completed. Summer comfort is fast becoming as much of a necessity as winter comfort.

Types of Systems

To get down more closely to our study, the types of installations possible are widely varied, but they can be generally grouped as follows:

1. Small self-contained units, recirculation type.
2. Window type self-contained units, with fresh air supply.
3. Units, recirculation type, remote condenser.
4. Groups of units on single remote condenser.
5. Selective units operating alternately from one condenser.
6. Small central systems.
7. Large central systems.
8. Ceiling units, 3-ton and upward, for stores, etc.

Economic Reasons for Type Selection

Variations of the eight types of systems are used to suit job conditions. We are not wedded to either units or central plants. Each has its particular type of usefulness. A study of why one style of installation is more suitable than another is much too lengthy to go into here, but a few economic considerations might be mentioned.

First cost
Redecorating
Concealment
Selectivity
Space available
Facility of financing products
Low down payment on products
Mobility for alterations
Salvage value when moving
Facility for installing part at a time
Tie-in with winter air conditioning

Load Factor and Cost of Operation

Before considering prices and operating costs, the load factor must be understood from the water consumption and power standpoint. Operating costs can be closely calculated on a per-hour basis, but the type of system and operating conditions will determine the number of hours equipment will be operated.

To begin with, the operation is most often almost entirely manual, according to the personal feeling of the user or what he thinks his trade will find comfortable, often how little he thinks they will stand for.

Thermostats, perhaps humidistats, are included in many cases, but one of the most important considerations about this whole business is that very little can be done within reasonable cost about fully automatic control for economy of operation.

The reason is that there are two kinds of discomfort, only one of which registers on a thermometer. Humidity

registers on a humidistat but the two cannot be synchronized without unwarranted expense so as to control effective temperature, the feeling one has on the surface of the skin.

Inasmuch as this varies for different physical constitutions, the usual practice is to have the automatic controls act as a back-stop against too radical a condition and to proceed to operate the system more or less at will.

As an example, one restaurant open 15 hours out of 24, operated its plant an average of only 6 hours per day during June and July and 11.3 hours during August. Current and water cost ran \$1.08 per hour for the 18-ton system.

Another restaurant of the same refrigeration tonnage, open only for a noon meal, operated the full capacity 1.85 hours during the same period, quite a different load factor.

Both of these systems had more than one compressor which permitted the owner to turn part or all of the capacity on or off at will.

There is no end to that data that might be given about these jobs, but time will not permit too much of a study. It might be of interest, however, to note that the operation cost ran ½-cent per person served in the noon operated restaurant and from 1½ to 3½ cents in the higher-class, longer-operated place.

Actual operating experience in this particular type of job over a period of six years—and there were comparatively few jobs of this size prior to that—has given us a useful formula on cost of operation. Comfort cooling operating costs are approximately three-quarters of the cost of winter heating in the same area.

In homes, the same general formula applies. One ton of refrigeration will take care of one fair size room, say 20 by 20 ft., under average conditions. One ton can be produced by 1 hp., approximately 1,000-1,200 watts per hr. or 1 kw. at 5 cents equals 5 cents per hour. Water consumption costs 1/10-cent per hour and the total, for 10 hours time is 51 cents. Then the load factor comes into play. Probably the equipment is operated only 20 days out of 30 with a total for the month of \$10.

This does not mean, however, that an eight-room house would cost \$80 per month to cool, and the reason that eight rooms would not cost, to operate, eight times the cost of one room would be rather involved in engineering. It will be better understood by making a comparison with heating. Scarcely anyone will question that the eight rooms could be heated for a cost of operation not a

great deal more than heating one or two rooms alone.

Interest, depreciation, and obsolescence charges develop to be 15 per cent per annum of the initial cost of a job.

Usually a one-year free service guarantee is part of the contract.

Speed in Starting Up

The desired result from any properly engineered system is apparent in from 15 to 30 minutes for an office or home, and probably one hour for a business or industrial job.

A change of a few degrees will give summer air conditioning results whereas 0° to 70° F. is the change required in winter air conditioning. Therefore a heating system must be operated continuously but a cooling system permits economy of operation in allowing shut down when not in use. The come-back is comparatively fast.

The significance of this is that instead of buying a 5 to 10-hp. compressor to cool a whole house 24 hours a day, it is possible to use a small compressor and by electric switching, shut off the operation of a unit in one room and turn it on in another. This is referred to as the "selective system" and may be worked with one or many units with a fine saving in first cost and operation.

Partial Capacity for Short Usage

In order to make a point in connection with first cost and operating expense, a certain type of user should be described.

We have one air-cooled church, the equipment being of 3-ton capacity, sufficient to cool the interior without occupancy, with more capacity planned as afforded. Now we find that due to an unexpected development probably no more will be ordered.

The effect is quite perfect for the people attending the 8 o'clock services, comfortable for those at 9, only as good as the street at 10, and the late-comers of 11 are being fast compelled to get up for early church, a very much to be desired result in the mind of the clergyman.

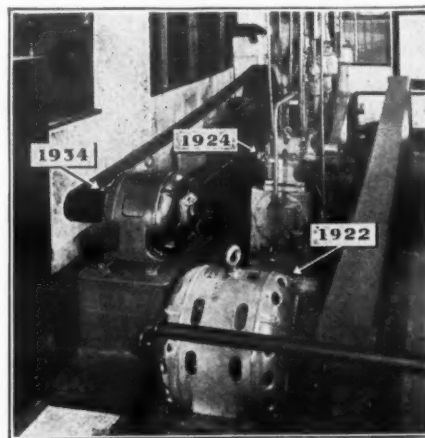
One formula has been derived from this and similar experiences. One per cent of the full refrigeration requirement per minute of occupancy is sufficient, provided the area is sealed and equipment operated an hour or two in advance to cool the air, the walls, floor, and room equipment, which is the "sensible heat," and to condense out the excess humidity which is the "latent heat."

About 1,000 B.t.u.'s of compressor capacity is expended per lb. of (Concluded on Page 8, Column 4)

AIR CONDITIONING REFRIGERATION



Century 2 Horse Power, Type RS, Repulsion Start, Single Phase, Induction Motor



Above are illustrated 3 Century 3-Phase Squirrel Cage Motors driving refrigerating machines in the Crystal Palace Market, San Francisco. Since 1922, when the first motor was bought, there have been no shut downs and no repairs.



Century Multispeed Squirrel Cage Motors—2, 3 and 4 speeds—meet speed change requirements in Air Conditioning installations. 1/8 to 200 H. P.



Just Out—

Bulletin 6-1 p11 tells all about Century Splash Proof Motors—Shows scientific design of "baffles" that keep out water coming from any angle. Illustrates Slip Ring, Flange Mounting and Two-way Ventilation Splash Proof Motors.

Century 1/250 to 600 h.p.
MOTORS

Fans... Blowers... Ventilators... Refrigerator Compressors... Pumps—in driving this and similar air-conditioning equipment Century Motors play a leading part. Many of them have been steadily on the job for more than 30 years—all of them set a conspicuous record in meeting the service requirements so essential in air-conditioning and refrigeration installations... Century Motors are furnished in Single Phase... Polyphase... Direct Current... Single Speed, Multispeed—1/250 to 600 Horse Power.

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

GET THIS

Table 2—All Air Conditioning in Kansas City, Mo.

(Compiled by the Kansas City Power & Light Co.)

Classification, Name, and Address	Manufacturer of Compressor	Sold By	Tonnage	Horsepower
Bakeries (This is only a partial list)				
*Advance Bakery, 2720 Oak	Frick	Olchoff	9	12
*Main Bakery Co., 4050 Penn	Baker	Natkin	23	25
Schulze Baking Co., 828 E. 22nd St.	Brunswick-Kroeschell	Natkin	25	34
Total for Bakeries			57	71
Beauty Shops				
*Marie Earl Beauty Shop, 314 Ward Parkway	York	York	5	5
*Proctor-Wayman B. Salon, 16 West 63rd St.	Strang	Strang	4	4
*Rose Munsterman B. Shop, 4757 Troost	Starr-Freeze		3	3
Total for Beauty Shops			12	12
Drug Companies				
*Katz Drug Co., 12th and Baltimore	Frick	Olchoff	50	60
*Katz Drug Co. (Balcony), 12th and Walnut	Frick	Olchoff	13	15
Stockyard Drug Co., Live Stock Exchange	Frigidaire	Frigidaire	3	3
Total for Drug Companies			66	78
Hospitals				
*Bell Memorial, 39th and Rainbow	Frigidaire	Frigidaire	3 1/2	1
*Menorah Hospital, 4949 Rockhill	Westinghouse	Natkin	2 1/4	2 1/4
*Research, 2300 Holmes	Westinghouse	Natkin	3 1/2	3 1/2
*St. Luke's, 44 Mill Creek	Frigidaire	Frigidaire	1 1/2	1 1/2
Total for Hospitals			4 1/4	4 1/2
Hotels				
Baltimore Hotel, 11th and Baltimore	Carrier	Carrier	50	50
*Hotel Kansas Citian (Bar), 11th and Baltimore	Ice			
*Muehlebach Hotel (Grille), 12th and Baltimore	York	York	53	125
*Muehlebach Hotel (Bar), 12th and Baltimore	Stratavant	Natkin	15	45
*Muehlebach Hotel (Coffee Sh.), 12th and Baltimore	Carrier	Natkin	38	75
*Pickwick Hotel (Bar), 10th and McGee	Home-made		10	10
Savoy Hotel, Ninth and Central	Frigidaire	Frigidaire	10	10
Phillips Hotel (Bar and English Grille), 12th and Baltimore	Brunswick-Kroeschell	Natkin	28	40
Total for Hotels			204	355
Mortuaries				
Fulton Funeral Home, 18th and Washington	Ice			
*Lindsey Funeral Home, 3811 Broadway	Carrier	Gustin-Bacon	7 1/2	9
*D. W. Newcomer & Sons, 46th and Paseo	Betz		4 (Est.)	4
Rose & Henderson, 4139 E. 15th St.	Ice			
Stine & McClure, 3235 Gillham	Ice	Natkin	17	3
Total for Mortuaries			28 1/2	16
Offices and Office Buildings				
*Betz Unit Cooler Co., 6 West Ninth St.	Betz		3 (Est.)	3
*Board of Trade Bldg. Of., Bd. of Trade Bldg.	Ice		1 1/2	1 1/2
Brown & Loe Produce Co., 104 E. Fifth St.	Ice			
*Brown-Strauss, 1446 Guinotte	Carrier	Gustin-Bacon	3	3
Glenn Carter Co., 3934 Main	Frigidaire	Frigidaire	2	2
*City Beverage Co., 20 Walnut	Frigidaire	Frigidaire	1 1/2	1 1/2
Continental Export Co., Ed. of Trade Bldg.	Frigidaire	Frigidaire	1 1/2	1 1/2
The Cutino Co., 807 Wyandotte	Frigidaire	Frigidaire	1 1/2	1 1/2
*Davis-Genung Motor Co., 3234 Troost Ave.	Strang	Strang	6	6
Delico Meat Products Co., 1206 Forest	York	York	4	5
Donnelly Garment Co., 1828 Walnut	Frigidaire	Frigidaire	3	3
Ell Lilly & Co., 906 Central	Carrier	Natkin	3	3 1/2
*Employers' Reinsurance Corp., Insurance Bldg.	Strang	Strang	1 1/2	1 1/2
*Faultless Starch Co., 1025 W. Eighth St.	York	York	5	6 1/2
*Federal Reserve Bldg., Tenth and Grand	(Steam Jet)		300	94
*Finance Credit Corp., 1300 McGee	Servel	Townley	5	5
*First National Bank, Tenth and Baltimore	Strang	Strang	1	1
*Frigidaire Corp., 2619 McGee	Frigidaire	Frigidaire	10	13
*Gustin-Bacon Mfg. Co., 1416 W. 12th St.	Gustin-Bacon	Gustin-Bacon	13	14 1/2
*Interstate Securities, City Bank Bldg.	Frigidaire	Frigidaire	1	1
*K. C. Fibre Box Co., Adams & Berger	Carrier	Gustin-Bacon	2	2
Kansas City Gas Co., Plaza Office	Carrier	Natkin	6	5
Kansas City Power & Lt. Co., 14th & Baltimore	York	York	180	250
Kansas City Power & Lt. Co., Plaza Branch	York	York	12	10
Katz Drug Co. (Offices), 1130 Walnut	Frigidaire	Frigidaire	12	10
Thomas McGee & Sons, Title & Trust Bldg.	G-E	Frigidaire	2	2
*Manor Baking Co., 4050 Penn	Servel	A. C. Corp.	35	54
*Michael-Swanson-Brady Co., 120 Walnut	Westinghouse	Townley	3	3
*Missouri Casket Co., 1350 Woodweather	Ice	Natkin	3 1/2	3 1/2
*Missouri Grain Inspection, Bd. of Trade Bldg.	Ice	Ice	1 1/2	1 1/2
*Moser & Suor, 2222 McGee	Norge	Olchoff	14 1/2	20
Palace Clothing Co., 12th and Grand	Frigidaire	Frigidaire	2	2
*Peppard Seed Co., 1101 W. Eighth St.	Carrier	Gustin-Bacon	10	11 1/2
Postal Life Insurance Co., 4727 Wyandotte	Universal	A. C. Corp.	10	12
*Rust Sash & Door Co., 1410 W. Tenth St.	Ice			
Uhlmann Grain Co., Ed. of Trade Bldg.	Frigidaire	Frigidaire	1 1/2	1 1/2
United Film Ad. Service, 2427 Charlotte	Betz	Betz	2 1/2 (Est.)	1 1/2
U. S. Cold Storage Co., 500 E. Third St.	Olchoff	Olchoff	4 1/2	5 1/2
*Universal Institute, 2821 Independence Ave.	Frigidaire	Olchoff	5	5
*Washburn Crosby Milling, 3100 Guinotte	Westinghouse	Natkin	3	3
*Western Auto & Supply Co., Candler Bldg.	Frigidaire	Frigidaire	2	2
Wolf Brothers, Inc., 1020 Walnut	Frigidaire	Frigidaire	2	2
Total for Offices			664 1/4	576
Restaurants and Night Clubs				
*Bismark Grille, 102 E. Ninth St.	G-E	A. C. Corp.	5	5
Bo Sing Young, 415 Alameda Rd.	G-E	A. C. Corp.	5	5
Engleman's Cafeteria, 1105 Grand	Frick	Woodling	40	49
Forum Cafeteria, 810 Grand	Ice	Woodling		
Forum Cafeteria, 1212 Main	Ice	Betz	7 1/2 (Est.)	7 1/2
*Fowler's Lunch, 1110 Baltimore	Carrier	Natkin	60	75
Fred Harvey, Union Station	Frigidaire	Frigidaire	13	16 1/2
*Italian Gardens, 1110 Baltimore	Frigidaire (Well water)			
Sam Kales, 1717 W. Ninth St.	Frick	Olchoff	6 1/2	22 1/2
Keithley's Grille, 3503 Troost	Copeland	Copeland	4	4
*King Joy Lo, 8 West 12th St.	Frigidaire	Frigidaire	20	26
*Martin's Cafeteria, 4638 Wyandotte	G-E	A. C. Corp.	15	15 1/2
*Martin's Cafeteria, 20 West 63rd St.	Frigidaire	Frigidaire	20	26
*Martin's Tavern, 47th and Wyandotte	Ice			
National Restaurant, 11th and McGee	Norge	Moser & Suor	20	23
*Plaza Royale, 612 W. 49th St.	Ice	Moser & Suor	25	28
*Pusateri's, 1217 Baltimore	Ice			
Reel Cafe, 108 W. 18th St.	Norge	Moser & Suor	20	23
*Southern Mansions, 1423 Baltimore	Copeland	Copeland	6	6
*Speyer's Grille, 1934 Grand	Copeland	Woodling	6	6
Thompson Restaurant, 15 W. 12th St.	Carrier	Gustin-Bacon	15	16 1/2
*University Club, 918 Baltimore	Frigidaire	Frigidaire	5	5
Walker's Lunch, 3108A Troost	York	York	25	25
Wolfman's Grille, 11th and Walnut	York	York	25	25
Total for Restaurants			305 1/2	379 1/2
Stores and Sales Floors				
*Chandler's Shoe Store, 15 East 11th St.	Frigidaire	Betz	10 1/2	10 1/2
*Chasoff's, 1018 Walnut	Strang	Frigidaire	7 1/2	9 1/2
*Davis-Genung, 3234 Troost	Carrier	Natkin	6	6
A. Diamant, 1205 Walnut	Frigidaire	Frigidaire	5	6
*Dollar Style Shop, 3905 Main	Carrier	Frigidaire	3	3 1/2
*Florsheim Shoe Co., 1009 Main	Carrier	Gustin-Bacon	3	3
*General Refrigeration Sales, 1931 Main	Betz	Betz	3	3
Grimme Shops, Inc., Bryant Bldg.	Frigidaire	Frigidaire	6	6
Helzberg's Jewelry Co., 1100 Walnut	Brunswick-Kroeschell	Natkin	10	13
Jack Henry, Inc., 4700 Wyandotte	(Cooled from Plaza Theater Lobby)			
*Page Dress Shop, 11 East 11th St.	(Cooled from Chandler's Shoe Store)			
*Palace Clothing Co. (Basement), 12th and Grand	Westinghouse	Natkin	22	25
*Price Candy Co., 1000 Walnut	Carrier	Gustin-Bacon	40	43 1/2
*Robinson's Shoe Store, 1016 Main	Frick	Olchoff	30	32
*Rubin's, 1004 Walnut	Servel	Townley	10	13
*Bennett Schneider, 213 West 47th St.	Frigidaire	Frigidaire	1 1/2	1 1/2
*Stover Bungalow No. 29, 63rd and Wyandotte	Strang	Strang	1 1/2	1 1/2
*Van-Dyke Fur Co., 1105 McGee	Westinghouse	Natkin	4 1/2	4 1/2
Total for Stores			163 1/2	181 1/2
Theaters				
*Gillis Theater, 506 Walnut	Ice	Woodling		
*Down Town Theater, 221 E. 12th St.	(Cooled from Tower Theater)			
*Isis Theater, 31st and Troost	Brunswick-Kroeschell	Betz	30	40
Liberty Theater, 1104 Main	Ice	Natkin	50	100
Lincoln Theater, 18th and Tracy				
*Lindbergh Theater, 4011 Troost	Betz	Betz	25	40
*Madrid Theater, 38th and Main	Betz	Betz	20	25
Mainstreet Theater, 14th and Main			180	250
Midland Theater, 13th and Main	Woodling	Woodling	300	500
Newmend Theater, 1118 Main			80	150
Plaza Theater, 47th and Wyandotte	Brunswick-Kroeschell	Natkin	100	200
*Regent Theater, 109 E. 12th St.	Betz	Betz	25 (Est.)	30
Ritz Theater, 12th and College	Ice			
*Rockhill Theater, 46th and Troost	Ice			
Southtown Theater, 56th and Troost	Ice			
Tenth Street Theater, Tenth and Central	Ice			
Tower Theater, 12th and McGee	Worthington	Worthington	125	175
Waldo Theater, 75th and Washington	Ice	Woodling		
Warwick Theater, 3327 Main	York	York	60	75
Westport Theater, 1307 1/2 Westport	Ice			
Total for Theaters			1,005	1,625

*1934 installations. †Betz Storage System. ‡Refrigeration obtained from main plant.

Table 1—Summary of 1934 Installations

Make of Installation and Representative	Number of Installations	Tonnage	Horsepower
Carrier (Gustin-Bacon)	12	107 1/2	115 1/2
Copeland (Copeland)	2	10	10
Frigidaire (Frigidaire)	38	117 1/4	138
G-E (General Electric)	20	138 1/2	153 3/4
Ice	3		
Ilg (Ilg)	6	4 1/2	4 1/2
Miscellaneous (includes one 300-ton Steam Jet Installation)	12	323 1/2	147 1/2
Norge (Moser & Suor)	5	86	93 1/2
Frick (Olchoff)	6	110	127
Servel (Townley)	4	19 1/2	22 1/2
Starr-Freeze (Evans-Kraft Co.)	1	3	3
Strang (Strang)	20	29	29
Westinghouse (Natkin)	20	47 1/2	48 1/4
York (York)	3	63	136 1/2
Total	149	1,059 1/4	1,029

Table 2—Concluded

Manufacturer of Compressor	Installations	Tonnage	Horsepower
Private Offices			
Carrier	1	2	3
Frigidaire	12	18	18
General Electric	2	1	1
Ilg	1	2	1
Strang	3	5	6 1/4
Westinghouse	3	2 1/4	2 1/4
Total for Private offices	22	32 1/4	35
Residences			
Carrier (Gustin-Bacon)	4	14	14
Carrier (Natkin)	5	9	9 1/2
Frigidaire	40	64	64
General Electric	8	36 1/2	36 1/2
Ice	1	10	10
Miscellaneous	4	10	10
Norge	1	7 1/2	7 1/2
Olchoff	3	15 1/2	17
Servel	1	1 1/2	1 1/2
Strang	14	13	14
Westinghouse	13	12 1/2	15 1/2
Total for Residences	94	184 1/2	189 1/2
Total for All Installations to Date	245	2,727 1/4	3,522 3/4

149 Conditioners Are Sold in Kansas City

(Concluded from Page 1, Column 3)

1934 than in all previous years put together, although the average size of installation was smaller in 1934. This is evident from the following comparisons, drawn from Mr. Mailard's tabulations:

	Number of Instal-	Total Tons per In-	Average of
	lations	tonnage	installations
During 1934.	149	1059	7.1
Total to date	245	2727 1/4	11.1
Before 1934..	96	1668	17.3

This reduction in tonnage plus a study of the establishments marked with an asterisk (*) in table II—to show that they were air conditioned in 1934—illustrates quite strikingly that air conditioning is rapidly spreading from the large theatre type of application to the larger market for smaller installations in homes, offices, stores, etc.

It is probably significant that 94 private homes in the city are now air conditioned, requiring 184 1/2 tons of refrigeration en toto. This is an average of almost exactly two tons of refrigeration per home.

It should be noted that the asterisk designation is not applied to the last two groups in table II, private offices and residences. Comparison of the total figure of 1934 installations, 149, with the number of asterisks in table II indicates, however, that more than half of the private offices and residences now equipped with air conditioning had it installed during 1934.

Mersfelder Explains Cooling Economics

(Concluded from Page 7, Column 5)

moisture condensed out of humid air. This cool, dried air is then ready to cool the occupants as they come in.

The point, therefore, is that an area to be used say only 30 minutes for a meeting, funeral service, etc. will be quite comfortably cooled by refrigerating equipment of only 30 per cent of the capacity required were it to be occupied 100 minutes.

However, this is contingent upon no special need for smoke or odor removal, upon ample time to prepare the area, and upon a proper number of air changes.

Initial Cost

Under the types of systems offered by the various manufacturers there appears first the small, self-contained floor units, recirculation type, semi-mobile, requiring only water, waste, drain, and electric plug-in, these ranging from \$400 to \$600 installed, in several sizes less than a ton in capacity, to take care of a small room.

Second, the window type, self-contained, all-year conditioners, with fresh air supply, at \$750 to \$850.

Third, floor units, recirculation type, remote compressor, at approximately \$750.

Fourth, groups of units on single remote compressor. These cannot be specifically estimated because they can readily build up into quite extensive systems.

Fifth, selective units operating alternately from one compressor. A

1-ton compressor and two floor cabinets will range about \$1,000 to \$1,200. This will probably be the favorite unit system for most moderate size homes, taking care of the living quarters during the day and the sleeping rooms at night. From 1-ton it will build up as required.

Sixth and seventh are the small and large central systems which depend on design and capacity for price.

Air-cooled compressors are often more economical in the smaller towns. Frequently, water-cooled machines cannot be used at all.

Eighth, larger capacity ceiling units, 3-ton size and up, for stores, etc., start from \$1,000 to \$1,400 installed. One of these can be set up in a little over one day and will take care of a moderate size store, small candy plant, or similar area. Heating and humidifying can be added.

A comparison of first cost of duct and unit systems for the average job will show very little difference. The tonnage of refrigeration would be practically the same for either type and the cost of operating would be practically equal.

However, it might be mentioned at this point that one duct system installed for cooling but incorporating winter air conditioning, actually saved enough on heating through the economies of recirculation, to cover all cost of operating summer cooling system and still reduce the old heating bill by 20 per cent.

Economies to the User

A little about tangible economies to users will be interesting. One company sending and receiving trans-oceanic messages found that an average sending speed in cool weather of 40 words dropped off 25 per cent on hot, humid days. When weather like a crisp October day was moved into the room, the average went up again. A statistician can quickly turn that into dollars and cents.

In that telegraph room, the repairs to delicate instruments have been greatly decreased through elimination of dust and excess moisture.

The majority of the good eating places have cooling systems. They are getting the system for nothing. Their competitors are paying for it for them in the business sent to the cooled restaurant.

One hotel has been keeping a group of conditioned rooms full and getting \$1 a day more for them.

Office floors rent for the same price per sq. ft. in the center of the floor (usually used for files and storage) as the outside window frontage. We have treated some of this space and turned it right around. An interior conditioned conference room is now considered far ahead of the noisy, dusty, hot, outside office.

A second floor in an office building had been vacant most of the time during six years because of street noise, dust, and heat. Conditioned air and closed double windows took it right out of the liabilities and put it in the assets.

Industrial Processing

A discussion of the economic value for industrial processes is too big to do more than mention some of the unusual types we have served. Color photography, storage of rubber goods, orchid culture, musical

ENGINEERING

Household Refrigerator Controls Developed for Replacement Use

By Wilkinson Stark, Sales Engineer, Cutler-Hammer, Inc.

CONTROL is the mind center of the domestic refrigerator. It tells the refrigerator when to start and when to stop, protects the motor from overheating and may provide for defrosting the evaporator. It has undergone an intensive period of development during the last five years. This development is a natural part of the growth of the refrigerator industry. The development of the modern domestic refrigerator is familiar to readers of *ELECTRIC REFRIGERATION NEWS*.

The majority of the early installations consisted of separate units assembled and charged on the job with the evaporator often mounted in the former ice box. Most of these early refrigerators employed relatively large evaporators with brine tanks. They were operated at higher temperatures and closer temperature differential than are generally used for present-day refrigerators.

The modern electric refrigerator is a complete device and many are shipped from the factory ready to be plugged into the electric circuit. They must meet much more exacting requirements in the quick freezing of ice cubes and desserts, frozen fruit storage compartments, and the reliable refrigeration of foods.

These modern refrigerators in general have evaporators with smaller thermal capacity permitting their operation over a wider temperature differential. In order that they can be adapted to all of the user's requirements, they are equipped with adjustable temperature control.

Development of Controls

Control development has paralleled the development of the electrical refrigerator. The early forms of control were most frequently pressure-operated devices. They did not supply any function other than the automatic starting and stopping of the refrigerator to maintain a fixed temperature and were not equipped with cold control for customer adjustment.

Pressure-operated devices were most generally used for several reasons. They could readily be attached to the compressor and were, therefore, suitable for a greater variety of applications. The small temperature differentials permitted with these early machines made temperature controls more expensive and less reliable.

Some early varieties of temperature-operated controls employed the warping of bi-metal for the actuating element; others operated due to the expansion of a liquid or gas. One form of early domestic refrigerator control operated due to the expansion obtained when freezing a mixture of water and alcohol.

The modern refrigerator control is almost universally temperature-operated. Likewise it is almost universally built around the limited charged metal bellows.

The pressure-operated control is no longer popular for several reasons. Since it must be connected into the compressor system it forms an unnecessary source of gas leakage. Should any control trouble develop, it likewise involves the probable necessity for recharging the refrigerator in order to permit replacement of the control.

Pressure-operated control is most conveniently installed in the machine compartment which renders cold control either more complicated or less accessible. Finally, the pressure-operated control is an indirect means of accomplishing the result the user is seeking, i.e., control of temperature.

Limited Charged Bellows

The limited charged metal bellows

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as used in modern domestic refrigerator control consists in general of a corrugated brass metal bellows with a wall thickness of approximately .005 in.

This thin wall bellows is in general made by a hydraulic process in which the metal is first drawn into a closed end tube after which hydraulic pressure is applied to force the walls of this tube into a special die or machine to form the corrugations.

To this bellows is attached a capillary tube with a bulb for picking up the temperature at a point remote from the control.

Bellows Filled with Vapor

This metal bellows is filled with the saturated vapor of a suitable refrigerant so that all of the refrigerant will be in the vapor state when the bellows assembly is subjected to a temperature a few degrees higher than the maximum operating temperature (seldom in excess of 50° F.).

At a temperature in excess of this value the pressure of the refrigerant in the bellows increases only due to gas expansion which is very small as compared to the increase in pressure which would obtain if a greater amount of refrigerant were present, so that liquid would be in the system at all times.

A few years ago many of these bellows were filled with sulphur dioxide or isobutane. Today they are almost universally filled with methyl chloride vapor due to the lower operating temperatures required.

A methyl chloride charged bellows as used in modern domestic refrigerator control is satisfactory for temperature operation from zero, or even as low as minus 10° F., up to the usual maximum of about 50° F.

Temperatures Over 50° F.

It can be used for temperatures somewhat higher than 50° F., i.e., 60° to 70° F., but such higher temperatures involve excessive pressures requiring heavier walled bellows, with resultant loss in sensitivity.

The pressure exerted due to one of these bellows is a function of the coldest temperature at any point in the bellows system. This is readily understood when considering the fact that vapor adjacent this coldest spot will condense.

More vapor will flow to this spot and condense until the entire system reaches a pressure corresponding to the temperature of the refrigerant at this coldest spot. The amount of refrigerant in one of these bellows systems is very small, in the order of a drop, and the condensate only a dew on the wall.

The operation of a refrigerator control in which the bellows system is filled with liquid would be entirely different. In this latter case the pressure exerted by the bellows would be governed by the warmest spot in the system rather than the coldest.

The refrigerant at this warmest spot would develop a vapor pressure which would be transmitted through the entire system. With a limited fill, however, there is no liquid refrigerant at any but the coldest spot, the rest of the bellows system being filled with vapor.

From the above discussion it is obvious that if the bulb is to control the temperature at all times, it must be mounted so that it is always the coldest point in the bellows system.

Hermetic and Open Type Controls

Modern domestic refrigerators can be divided into two general classes, i.e., hermetic or sealed-in type, and open types. There are some differences in the control for each. Both require a thermostat for temperature regulation.

The hermetic type, however, in general employs some type of relay for controlling the starting winding of the motor. This starting relay replaces the usual centrifugal motor switch. As the motor is enclosed in the gas system, the sparking resulting from a centrifugal switch would be harmful.

These starting relays for the hermetic refrigerators are generally current-operated devices. When the thermostat closes the circuit to start the refrigerator, the heavy inrush or

starting current causes the relay to lift its plunger and close the starting contact.

As the motor accelerates, the current falls until a value is reached at which the plunger drops, opening the starting contact and closing the running contact.

The motors used with these hermetic refrigerators are of two general types, split-phase and condenser. The split-phase motor has two windings which have different characteristics so as to obtain a difference in phase with a resulting starting torque.

Improvements in Motors

There has been considerable development in the design of this type of motor so that they are now available with starting torque comparable to that of the repulsion-induction motor.

Many of the split-phase motors used for hermetically sealed refrigerators have an external starting resistance connected in series with the starting winding. This reduces the heat loss in the motor with resulting greater efficiency.

The capacitor type motor has several advantages for refrigerator service. It is more quiet and efficient in operation and has exceptionally high starting torque when properly applied and controlled. The most commonly used control for the capacitor motor consists of a current operated relay with up and down contacts to transfer connections in an auto-transformer capacitor circuit.

In general, the same type of thermostat unit is used for the control of both hermetic and open type domestic refrigerators. The usual form of thermostat used for modern refrigerators is provided with a cold control adjustment.

This cold control knob rotates a screw to vary the pressure on the bellows, and consequently the temperature at which the bellows will overcome its spring and operate the contacts. The usual range of cold control adjustment is from 10° F. to 15° F.

Another adjustment is generally provided to vary the temperature difference between opening and closing of the contacts. Quite frequently this is used as a factory adjustment only and is sealed to prevent changes. Once the factory has determined the proper differential for a given refrigerator, it is unnecessary to readjust it.

Overload Protection

It is now a requirement of the Underwriters' Laboratories that all domestic refrigerators be equipped with an overload for motor protection and this must be of the free-tripping type. A free tripping overload is one which will operate even though the reset or start button is held to the closed position.

The overload mechanism is generally included as a part of the thermostat unit together with an "off" and "on" switch. The most common form of overload device at present consists of a solder type thermal element operated by a heater placed in the motor circuit.

When the current exceeds a safe value for a sufficient length of time the solder melts and a spring causes the contacts to trip. When the solder again hardens, the overload trip can be latched and the contacts closed.

Very special solders are used for these thermal elements, which have an accurate melting point, much lower than that of ordinary 50-50 solder.

Use Special Solder

If one of these thermal elements should become defective and be resoldered with other than the special alloy as used by the control manufacturer, its tripping current may be greatly changed so that it would no longer furnish motor protection.

The heater coils used in modern refrigerator control have small metal tags carrying their current ratings. These ratings are in turn stamped on the outside of the control box. The Underwriters' Laboratories recommend that this heater should not exceed 140 per cent full load motor current as higher heater ratings may result in incomplete motor protection.

This rating should be determined, however, by the relation between the motor full load nameplate rating and the maximum current at which the motor can operate without overheating.

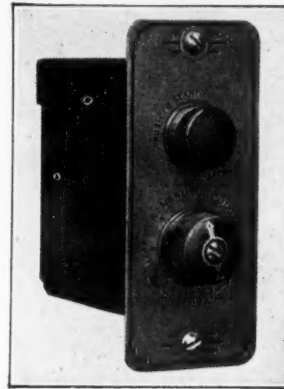
Obviously, it is possible for a refrigerator manufacturer to use a motor which is so rated that it may be fully protected by a heater larger than 140 per cent full load motor current, and such larger heaters are permissible where the refrigerator manufacturer submits satisfactory proof to the Underwriters' Laboratories.

Manufacturing Refinements

Many refinements have been made in the manufacture of modern refrigerator control during recent years. Some thermostats are designed for a very high degree of accuracy. They will cycle for hundreds of thousands of operations without change in operating temperatures in excess of 1/4° F.

To obtain this high degree of accuracy, controls are operated mechanically for several thousand opera-

Replacement Control



Cutler-Hammer's replacement control, built to suit the majority of household refrigerator requirements.

tions before being set for temperature at the factory. These controls are then placed in ovens for several days to age at a temperature of 150° F., so that when they are placed in service they will show no gradual change in operating temperatures due to aging.

In general, unaged controls show gradual lowering of operating temperatures. This aging effect may be in the order of 2 or 3° over a period of a year. In setting controls to the exact specifications now required by refrigerator manufacturers, it is very desirable to cycle the control as in normal operation rather than to adjust the control in a fixed temperature bath.

Barometric Pressure

In order to obtain the highest degree of accuracy it is essential that proper corrections be made for variation of barometer, and to adjust all controls to a fixed standard of barometric pressure. Barometric pressure

at a given location may be such as to account for as much as 1° or even 2° change in temperature setting.

It is common practice for refrigerator manufacturers to make minor changes in temperature settings for high altitudes. Average barometric pressure due to changes in altitude roughly amount to 1/2° F. per thousand feet change in altitude.

It is customary practice to make no correction for altitudes between sea level and about 2,000 ft. Above 2,000 ft. altitude temperature settings are changed to compensate for the lower average barometer.

The modern refrigerator control is equipped with a so-called altitude indicator to facilitate this or any other field change in temperature setting. This altitude indicator is a pointer permanently fixed to the cold control shaft. Changes in temperature settings are made by loosening the knob and moving it to a new position.

With this arrangement it is possible at any time to determine whether or not the temperature setting of a control has been changed from the factory adjustment and just how much it has been changed. It is likewise possible to return the cold control knob to the original factory setting.

Control in the Evaporator

It has been common practice in recent years to mount the thermostat either within the evaporator or adjacent thereto. This provides an economical and convenient location for the control.

Obviously, the tripping current of the thermal overload device will be increased by such mounting, which is affected by the surrounding temperature. Smaller heater coils should be chosen for such application in order to fully protect the motor.

When mounted in the evaporator, the control may be subjected to an excessive amount of moisture. It is essential, therefore, that controls for

(Concluded on Page 10, Column 1)

Celotex INSULATION ASSURES TIGHT CABINETS

Heat-Leaking Cracks and Joints Reduced to Minimum

Celotex is an *efficient* insulating material. It is used in the manufacture of *efficient* refrigerators, ice cream cabinets, water or bottle coolers. Its use reduces heat-leaking cracks and joints to a minimum. Each insulated area of the cabinet is covered by a single board cut the precise length, width, design and thickness.

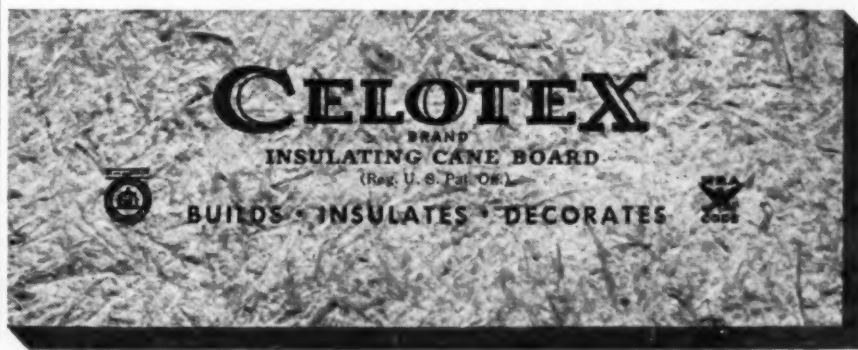
Fabrication is done at the Celotex mills, according to your specifications, for any space required, for any form or type of cabinet design.

This adaptability, together with the high degree of insulating efficiency of the material itself, explains in some measure the extensive use of Celotex in the refrigerator field for more than a decade.

STERILIZED—WATERPROOFED—SANITARY
DRY-ROT PROOFED—TERMITE PROOFED

We invite consultation with our refrigeration specialists

THE CELOTEX COMPANY
919 No. Michigan Ave. Chicago, Ill.



Stark Relates Service Problem on Controls

(Concluded from Page 9, Column 5)
such application be adequately protected against corrosion and electrical leakage due to moisture. If the overload is mounted within the control, the small heat input in this unit will, in general, prevent condensation.

Cycling Defrosting

At present, there are in vogue several special control arrangements for defrosting the evaporator. One very commonly used method is to provide a sufficiently wide range of cold control so that the cut-in temperature will be appreciably above 32° F.

This causes the evaporator to defrost at each cycle and yet maintain refrigerating temperatures. This usually requires a considerable rotation of the dial beyond the warmest normal setting at which no defrosting occurs. Similar results can be obtained with what is usually termed "wide cycle defrosting."

Such a control has a position beyond the warmest normal operating position at which the cut-in temperature is raised to a much higher value, usually about 39° F. This is accomplished without appreciably raising the cut-out temperature above the adjacent normal warmest position.

This provides slightly lower average temperatures than obtained with straight range control with the same effective defrosting. It involves, however, a loading mechanism with its additional complication and possible trouble.

Semi-Automatic Defrosting

Recently a number of controls have been marketed with so-called semi-automatic defrosting. Controls of this type have a separate defrosting lever which, after one defrosting cycle, returns to normal position. With such control it is only necessary to initiate the defrosting cycle manually, the control automatically returning to normal operation.

With semi-automatic defrosting, it is essential that cut-in temperatures on defrosting be much higher, than that used for the cycling type of defrosting control. This is necessary to insure that all of the frost and ice will be removed before the refrigerator restarts.

Full automatic defrosting can be accomplished in several ways. One method of obtaining full automatic defrosting consists of a clock switch. This makes it possible to control the time of day at which defrosting occurs, but the expense of this type of installation is greater.

Service Problems

All of this control development leaves in its wake a tremendous control service problem. Not only are there still a few of the early make-shifts to be heard from, but even during the past five years there have been a constant procession of complete new control designs in the field.

Some of them have scarcely lasted out the year until they were replaced by a complete new design.

Any completely new product, be it refrigerator, automobile, refrigerator control, or what not, needs the improvement resulting as the aftermath of a year or more in the field before it is fully satisfactory.

Aside from the possible change in temperature setting, the servicing of a modern refrigerator control is usually a matter of replacing the defective unit with a new one. This is necessitated because control faults often require retesting at the factory. The largest single factor in control failures is leaky bellows. This is often caused by undue bending of the central tube.

The question has often been raised as to whether or not some average control could not be used for service. A control with a normal setting to cut out at 15° F. and cut in at 27° F. with approximately 10° range on the cold side and the defrost side will serve most purposes.

With an altitude indicator and adjustable cold control knob, the service man can easily raise or lower temperatures as required. A 4 or 4½ ampere heater coil will provide motor protection for the average job.

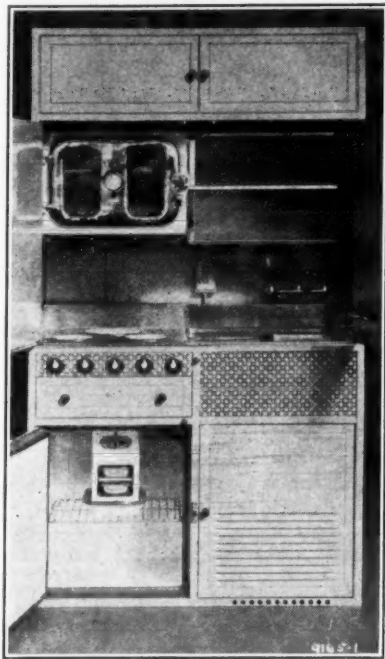
Perhaps in the not distant future, there will be at least some degree of standardization for refrigerator control. The control service problem will, however, continue to be a complicated one for many years to come.

Chicago Home Exhibit Will Open Feb. 16

CHICAGO—The Modern Home Exposition which is being held with the cooperation of the Federal Housing Administration will open Feb. 16 at the Coliseum here for a week's run.

More than 250 manufacturers and dealers are expected to be represented with 350 exhibits of products allied with the building industry. Experts in various phases of modernization and home furnishings are scheduled to speak at the sessions.

In the White House



This kitchen, equipped with a Universal Cooler condensing unit, has been installed in the White House executive offices.

Presidential Offices Are Equipped with Cabinet Kitchen

WASHINGTON, D. C. — A "Pure-aire" kitchen made by the Parsons Co. of Detroit and equipped with a Universal Cooler refrigeration system has been installed in the newly opened Presidential executive offices adjoining the White House.

The kitchen, which is of the enclosed, cabinet-type often found in small apartments and hotels, is used to prepare lunches for the secretarial staff when they are too busy to go out for meals or when they are working overtime.

A universal cooler ½-hp. condensing unit is placed in the base of the cabinet, and adjoins the refrigerator compartment, which has 4.25 cu. ft. of food storage space.

Above the refrigerator compartment is an electric range with three burner units, and above the range is an oven. A Monel metal sink is built over the condensing unit compartment. Shelves, cupboards, and a cutlery drawer complete the equipment. All working surfaces are of Monel metal.

N.Y. Service Firms Hear Interpretation of Tax

(Concluded from Page 1, Column 3)
sales tax imposed by the City of New York.

This 2 per cent retail sales tax applies to all sales of materials used on refrigeration work. Its application to refrigeration repair, service, adjustment and maintenance covers material only and not labor, the legal counsel explained.

There is no tax on service charges. The tax on sales is levied on the ultimate user, there being no tax on wholesaler to dealer sales.

A personnel list of employees is being maintained for the purpose of assuring continuous employment where possible by transfers from firms who are not so busy, to companies that are busy and in need of competent men. The secretary of the association acts as the information bureau.

A code committee consisting of three members was appointed to investigate, report and act (with the cooperation of the legal counsel) against unfair trade practices.

According to Mr. Laape, the contract committee is preparing a series of standard forms covering credit investigations and reports, maintenance contracts, deferred payment sales agreements and standard service rates.

Conrad Appointed Dealer For Crosley Radios

LOGANSPOUT, Ind. — The A. E. Conrad Co., 500 North St., this city, has been appointed a dealer for Crosley radios by the Davidson Sales Co., distributor in South Bend, Ind.

Binks Co. Opens Plant in Windsor, Canada

CHICAGO—Binks Mfg. Co., maker of Binks water cooling systems and spray paint finishing systems, has formed a Canadian company to be known as the Binks Mfg. Co., of Canada, Ltd. Headquarters of the new firm will be in Windsor, Ont., Canada.

Second Kelvinator School Is Held

DETROIT—Kelvinator Corp. began the second of its current series of air-conditioning engineering schools on Monday of this week at its Plymouth Rd. plant. The first 10-day course was concluded Nov. 28. A third has been announced for Jan. 14-25.

Attended by men representing the application engineering departments of Kelvinator distributorships, the sessions are a development of Kelvinator's plan to have its air-conditioning equipment installed and serviced only by engineers trained in the work. Most of the material covered is of an advanced nature, previous experience in heating, ventilating or air-conditioning work being a prerequisite to entrance.

M. C. Terry, manager of Kelvinator's commercial applications department, was in charge of the first 10-day school. Lectures on theory and application of air conditioning were given by C. L. Toonder of the department's air-conditioning engineering staff.

Others addressing the sessions included C. VanMannen, Kelvinator automatic heating manager; H. M. McGaughey of the company's service department, who spoke on servicing and installation; and A. E. Knapp, development engineer, who discussed design features and development engineering.

Engineering topics treated in the first school were:

1. Fundamentals of air conditioning, including a study of scientific laws concerning air conditioning; instruments used in measuring air-conditioning effects; the Kelvinator humidity chart; thermodynamics of air conditioning; and methods of air conditioning, emphasizing cooling and dehumidifying by direct expansion surface coolers, air-conditioning equipment and refrigeration systems, and equipment in common use.

2. Kelvinator air-conditioning products; cycles of operation; features; capacity tables; specifications; accessories; and control methods.

3. Application forms and instructions—survey and load estimate forms; room unit systems and applications; and remote units and central station applications, including design and estimation of sheet metal duct distributing systems, multiple hook-ups and selection of cooling towers.

4. Estimates, proposals, lay-out drawings, etc.

G-E Plans School on Air Conditioning

(Concluded from Page 1, Column 4)

those enrolled to bring only the minimum amount of personal equipment.

Each week of the training course will consist of five days of instruction with a written examination each Saturday morning. One hour at the end of each of the five weekly training days will be devoted to supervised physical instruction including setting-up exercises and various indoor sports. Out-of-door winter sports also will be available to those who desire them.

During the morning, the students in the new school will devote their time to classroom and lecture work, while afternoons will be spent in laboratory work with the actual air-conditioning equipment and in the treatment of field problems. In addition, a number of special lectures will be given by prominent men in the General Electric organization and in the air-conditioning field. Successful completion of the course will be evidenced by a diploma and the G-E Air Conditioning Institute pin, which will be presented at a graduation dinner at the end of the school.

Officers of the special air-conditioning sales engineering school will be J. J. Donovan, president, G-E Air Conditioning Institute; Elliott Harrington, director; and D. W. McLennan, assistant director.

G-E Institute Celebrates First Birthday

(Concluded from Page 1, Column 2)
department, and L. C. Kent, executive manager of the institute.

Following the anniversary exercises, the institute held open house to the public from 7 to 10 p. m., repeating the open house nightly through New Year's except for Sundays and Christmas and New Year's Eve.

During the first year of its existence the institute received more than 50,000 visitors from every corner of the world.

These have been grouped in the following classifications: 1) business and casual visitors; 2) groups for conference or instruction; 3) groups coming for particular information on their lighting or other electrical problems; 4) general interest groups, such as schools and clubs; 5) groups who avail themselves of the institute's facilities to hold their own meetings there; 6) visitors who attended "open house" on Tuesday evenings.

Frogs Used in Laboratory Kept at 4° F. in G-E

INDIANAPOLIS—Until needed for testing digitalis, hundreds of frogs are kept in cold storage, 4° F. above freezing, in an S-185 General Electric refrigerator in the new research laboratory building of Eli Lilly & Co., here.

The refrigerator shelves have been replaced by nine sliding trays, each about 3 in. deep.

Penn to Introduce New Controls in 1935

DES MOINES, Iowa—Penn Electric Switch Co. is planning to introduce several new products and improvements in its line of refrigeration and air-conditioning controls in 1935, it was revealed by Nelson B. Delavan, sales manager.

Penn Electric Switch will advertise more extensively in the refrigeration and air-conditioning field.

BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE

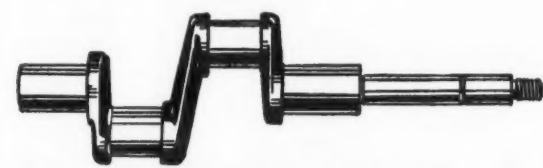
TO THE REFRIGERATION INDUSTRY

SPECIAL ADVERTISING RATE (this column only)—\$12.00 per space.

Payment is required monthly in advance to obtain this special low rate.

Minimum Contract for this column—13 insertions in consecutive issues.

SHAFTS . . . Crank and Eccentric



for Compressors, made to YOUR Specifications.

Manufacturers—Send Blue Prints for Quotations.

MODERN MACHINE WORKS, INC.

Specializing in the Manufacture of SHAFTS

2207 Kirkwood Ave.

Cudahy, Wisconsin

RANCO THERMOSTAT

The Stainless Steel RANCO TBS fills the replacement needs of practically every household refrigerator, water cooler and ice cream cabinet.

OVERSIZE DIAL PLATES are available for large mounting panel holes, and will be furnished in place of standard plates at no extra cost.

MARKING—Every model is stamped with factory code number and temperature settings. Lever and dial positions are plainly marked on the plate.

MAINTENANCE—Designed to reduce the cost of maintenance and repair. No broken bases or covers.

For complete information write for Service Bulletin 623

THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY
1300-10 Indianola Avenue, Columbus, Ohio

A convenient way to keep your back issues of the News

We offer a binder designed and made especially for keeping your file copies of Electric Refrigeration News neat and always available for ready reference.

It is made of stiff board covers, attractively bound in good quality of black imitation leather. The name Electric Refrigeration News is stamped in gold on the front cover and backbone.

The price is \$3.75 shipped to you post paid in the United States and Possessions and Pan-American Postal Union countries. For all Foreign countries, postage based on a shipping weight of 6 pounds must be added to this price. Send your remittance with order. May we send you one?

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.



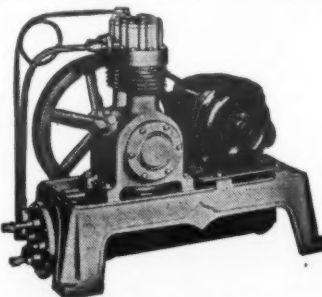
KASON HARDWARE

TWO NEW HINGES

No. 1073 16" Strap
No. 1077 22" Strap
Heavy Duty hinges of finest quality Brass equipped with two case-hardened, ball-bearing washers and an additional supporting lug.

Write for descriptive literature. Samples on approval.

KASON HARDWARE CORP., 61 Navy St., Brooklyn, N. Y.



Style EW—Water Cooled
With Water Cooled Head

STARR FREEZE OUTSTANDING PERFORMANCE attested by satisfied users — EVERYWHERE!

Sturdy Condensing Units from 80 to 2868 Lbs. I.M.E., and all other commercial refrigeration equipment—Wall type cases with machinery—A beautiful household line of modern, conservative styles—Write for full data.

THE STARR COMPANY

Cable "Starr" Richmond, Indiana (factory) Since 1927
1344 S. Flower St., Los Angeles, Calif.

Spring Action SHIELDED CUTTER ARM



Patent Pending

HENRY TUBE CUTTER

3 sizes: No. 10, 1/2"-3/4"; No. 20, 1/2"-1 1/4"; No. 30, 1"-2 1/4". Has large replaceable tool steel cutter wheel, ground edge. Rollers reduce friction to minimum. The ideal tool for hard drawn tubing.

HENRY VALVE CO.

Specialized Valves & Fittings for Refrigeration
1001-19 N. Spaulding Ave., Chicago

WRITE FOR BULLETINS DESCRIBING HENRY REFRIGERATION SPECIALTIES

QUESTIONS

Specifications Data

No. 1998 (Manufacturer, Illinois)—“Would it be possible for us to secure from you information pertaining to the following makes of boxes: Gen-

eral Electric, Frigidaire, Kelvinator, Norge, Crosley, Grunow, Westinghouse, Stewart-Warner.

“Ice poundage, shelf area, and retail prices, as well as model numbers for the approximately 4, 5, 6, and 8-ft. boxes.”

Answer: Complete specifications covering the makes you have listed and some 30 other makes of household electric refrigerators were published in the May 30 issue of ELECTRIC REFRIGERATION NEWS.

Copies of this issue may be obtained

at a cost of 10 cents each by addressing Business News Publishing Co., 5229 Cass Ave., Detroit, Mich.

Sales Figures by Sizes

No. 1999 (Advertising Agency, Ohio)—“I wonder if we could ask you for some information on electric refrigeration sales which you doubtless have on hand.

“We would like to know how many electric refrigerators have been sold to date during 1934, what the average retail price has been, and also what the average capacity of the refrigerators have been.

“If it should happen that you have information concerning the percentage of the total number of units sold which come within the various price ranges and also within the various capacity ranges, we would like also to have this information.

“We realize that it would be much easier for you to give us this information at a later time when all of your figures for the entire year have been compiled, but we will appreciate very much any information you may be able to supply us with at the present time.”

Answer: We have estimated that 1,315,400 household electric refrigerators have been sold by manufacturers to distributors and dealers during the first 10 months of 1935.

As yet, we have not determined an average retail price for household units, but it will probably be roughly about \$170 to \$175.

Sales reported by member companies to the Refrigeration Division of National Electrical Manufacturers Association are listed by cabinet sizes, but we will not have a cumulative tabulation showing sales by capacities until final reports for the year are in.

Sales figures for each month through October have been published in weekly issues of ELECTRIC REFRIGERATION NEWS as soon as they have been released by the Refrigeration Division of Nema and you can probably get an idea of distribution by sizes by studying these reports.

Door Gaskets

No. 2000 (Service company, Illinois)—“Kindly advise us where the manufacturer of Jarow door gaskets can be located.”

Answer: Jarow Products Corp. is located at 143 W. Austin Ave., Chicago, Ill.

Commercial Machine Code

No. 2001 (Utility company, Pennsylvania)—“I understand there is in effect a refrigeration code applicable to retail refrigeration machinery distributors. Would you please be kind enough to send me two copies of this code?”

Answer: All commercial refrigerating machines powered by motors of 1 hp. or larger are governed by the code for the refrigerating machinery industry, text of which was published in the Oct. 10 issue of ELECTRIC REFRIGERATION NEWS.

Commercial refrigerating machines in sizes less than 1 hp. fall within the scope of the NRA code for the electric refrigeration industry which is supplemental to the basic code for electrical manufacturing industry. Text of this code was published in the June 13 issue of ELECTRIC REFRIGERATION NEWS.

Detroit Manufacturers

No. 2002 (Supplier, California)—“We have been referred to you as a possible source of information regarding the purchase of refrigeration equipment in or near Detroit.

“We are interested in building up a refrigeration unit in the fractional horsepower class and would require for this purpose compressor bodies only. If you could furnish us with the name of a manufacturing concern engaged in this phase of the business we would be glad to get in touch with them.”

Answer: There are four manufacturers of compressors for fractional horsepower refrigeration units located in Detroit:

Copeland Refrigeration Corp., Lincoln & Holden Aves.
Kelvinator Corp., 14250 Plymouth Rd.

Norge Corp., 670 E. Woodbridge St.
Universal Cooler Corp., 7424 Melville Ave.

A complete list of all manufacturers of refrigerating machines is published in the 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK.

Ice Cream Cabinet Sales

No. 2003 (Manufacturer, New York)—“Will you please wire us your closest estimate total production commercial ice cream cabinets of all types from 1924 to date?”

Answer: Roughly estimated, ice cream cabinet sales from 1924 to date total between 600,000 and 650,000 units. This is based on figures collected from 1928 through 1933 which indicate that approximately 300,000 cabinets were sold in that period, and an estimate that double this number or perhaps slightly more were sold between 1924 and 1928.

'Coldspot' Specifications

No. 2004 (Reader, Massachusetts)—“The copy of ELECTRIC REFRIGERATION NEWS you sent me is dated May 30, 1934. The copy I want is the one containing specifications on the Sears Roebuck 'Coldspot.' Ten cents is enclosed.”

Answer: While specifications of almost all leading makes of household electric refrigerators were published in the May 30 issue of ELECTRIC REFRIGERATION NEWS, data on the “Coldspot” was late in arriving and was published in the July 11 issue.

Data to Instruct Salesmen

No. 2005 (Manufacturer, Wisconsin)—“We are contemplating a sales manual for our various salesmen and sales representatives, and would like to ask for your cooperation in getting some of the information.

“As a rule, sales representatives know very little about refrigeration and air conditioning, and it is therefore necessary for us to start at the very bottom and give them a complete A, B, C education on this line. Of course, we cannot make it too technical or complicated, because it would immediately defeat its own purpose.

“However, we want to give enough information in this manual so that all of our men will have a very clear cut and concise idea of just what the various systems are like, and the controls which are necessary for efficient operation.

“This information, of course, can all be worked up from scratch, but we are wondering if you would not have some source of information that would eliminate a lot of work on our part; that is, you undoubtedly know of some book or treatise on this subject which goes into it in the same manner in which we want to handle it.

“Our idea in going into this manual is to give our salesmen a better education so that they in turn can talk more intelligently to our customers, and be of greater service to them.”

Answer: ELECTRIC REFRIGERATION NEWS has been literally packed with good information on air conditioning in general, and also special phases of it. One excellent article on air-conditioning controls was written by D. D. Wile of the Detroit Lubricator Co. This appeared on page 14 of the Aug. 10, 1932 issue.

The booklet “The Automatic Control of Refrigeration” written by H. T. Lange and A. B. Schellenberg and published by the Alco Valve Co., 2628 Big Bend Blvd., St. Louis, Mo., is one of the best references available on refrigeration controls.

For basic information on the operation of electric refrigeration systems, we refer you to the series of articles on “orphan” makes of electric refrigerators which have been published this year (a list of the issues in which the articles appear has been published several times in ELECTRIC REFRIGERATION NEWS). The principles of operation covered in these articles are characteristic of most of the refrigeration systems in operation today.

We also refer you to the various lessons in the home study course offered by the Refrigeration and Air Conditioning Institute of Chicago which we are now publishing in issues of the NEWS. (See the Nov. 14 and Dec. 19 issues).

Winslow, Inc., Address

No. 2006 (Exporting firm, New York)—“Will you kindly give us the correct address for Dallas E. Winslow Co., Inc. We are unable to find this name listed in the 1934 issue of your directory.”

Answer: Dallas E. Winslow, Inc., is at Holden and Lincoln Ave., Detroit.

INFORMATION WANTED

'Vap-Air' System

Does anyone know what happened to the “Vap-air” system of refrigeration which was mentioned in a pamphlet entitled “Household Refrigeration” published by the National Electric Light Association several years ago?

'Clover-Olson' Unit

In about 1927 a commercial refrigerating machine bearing the name “Clover-Olson” was manufactured by a concern in California. Information concerning the name of the manufacturer, history of the company, and description of the machine desired.

Guardian Co. History

According to old records, one of the early manufacturers of household refrigerating machines was the Guardian Co. of Detroit. Patent rights were acquired by General Motors Corp. back about 1918. Does anyone have historical data concerning this company?

Information on the above subjects will be appreciated by the editors of ELECTRIC REFRIGERATION NEWS, 5229 Cass Ave., Detroit, Mich.

CLASSIFIED

RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

WANTED: Development engineer with at least two years' experience in the design of thermostats or oil burner controls. Must be a neat draftsman and capable of making detail production drawings as well as design work. State age and salary desired as well as education and experience in first letter. Box 660, Electric Refrigeration News.

POSITIONS WANTED

MANAGER, competent, to supervise sales and service, commercial and household, factory branch or large distributor. Can lay out commercial and air conditioning jobs. Eight years' experience refrigeration wholesale and retail. Or can effectively represent manufacturer of coils, cases or machine units. Territorial dealer set-up. Box 657, Electric Refrigeration News.

FRANCHISE WANTED

MANUFACTURERS REPRESENTATIVE contacting Michigan concerns is interested in new lines to sell especially to mechanical refrigerator makers. If you have something new to offer, let us help. We know the men to see and can get to them. In business over fifteen years. Commission basis only. Exclusive representation only. Box 654, Electric Refrigeration News.

EQUIPMENT FOR SALE

LARGE Chicago distributor wishes to dispose of used 1/2 to 10 H.P. Compressors taken in trade F.O.B. Chicago. Examples: 1 H.P. Norge dual, water cooler, complete with motor and controls—\$45. 19 Fedders Coils, SO₂ floats, valves and trays—\$2.50 each. L. H. Rykken, 3434 Nordica Avenue, Chicago, Ill.

PATENT SERVICE

HAVE your patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

REFRIGERATION SERVICE

HALELECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn. Ranco, Tagg, etc. Float valve needles reground and polished. Expansion valves repaired. Gas service, Ethyl, Methyl, Iso-Butane, Sulphur. Your cylinder or ours. Competitive prices. Distributors of “Flawless Brand” tubing. Halcetric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

SCHOOLS

MEN: Train for Refrigeration and Air Conditioning, at home, using same text material you would use in best resident school. Supervised individual instruction under licensed teacher with Doctor's degree. Shoenk School, Alton, Ill.

English Manufacturer of small Absorption Domestic Refrigerators made after a world-known absorption system in large works in London desires to cooperate or represent a well-known American or Canadian manufacturer of Automatic compressor Refrigerators of Cabinets above 12 cu. ft. for Commercial Trade purposes. Reply to

Box 661
Electric
Refrigeration News

● Extra Dry ESOTOO
LIQUID SULPHUR DIOXIDE
● V-METH-L
METHYL CHLORIDE
VIRGINIA SMELTING Company
WEST NORFOLK, VA.
131 State St., Boston, and
76 Beaver St., New York

“WHERE THERE ARE NO JOINTS THERE CAN BE NO LEAKS”

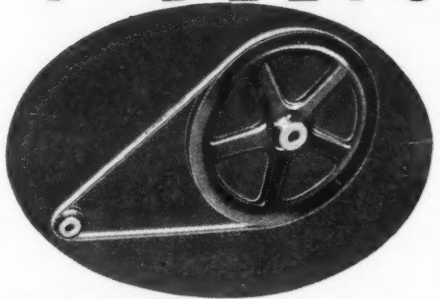
PEERLESS FIN COILS

PEERLESS ICE MACHINE COMPANY

CHICAGO TWO FACTORIES NEW YORK
515 W. 35th St. 43-00 36th St. L.I.C.

DAYTON V-BELTS

There is a Dayton V-Belt made especially for all makes and types of refrigerators, washing machines and other appliances. A stock is available near you. Send for price list and name of your nearest distributor.



THE DAYTON RUBBER MFG. CO.
DAYTON, OHIO

The world's largest manufacturer of V-Belts

Group Subscription Rates

The following special rates are for PAID-IN-ADVANCE subscriptions only in the United States and Possessions and Pan-American Postal Union Countries. Charge orders are billed at the single-subscription rate, regardless of number. Papers will be mailed to individual addresses.

	Electric Refrigeration News (weekly)	1935 Refrigeration Directory and Market Data Book (2 volumes)	Both Electric Refrigeration News and Refrigeration Directory
1 subscription	\$3.00	\$5.00	\$8.50
5 or more each	2.75	4.50	6.50
10 or more each	2.50	4.00	6.50
20 or more each	2.25	3.50	5.75
50 or more each	2.00	3.00	5.00
75 or more each	1.75	2.50	4.25
100 or more each	1.50	2.00	3.50

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

THE TRADEMARK OF FOUR
PACE SETTERS
IN COIL EFFICIENCY

SUR-E-FEX Fin Coils
FAN-E-FEX Diffusing Units
HUM-E-FEX Non-Dehydrating Coils
AIR-E-FEX Air-Conditioning Units

SEND FOR NEW CATALOG DESCRIBING THESE SENSATIONAL DEVELOPMENTS

REFRIGERATION APPLIANCES, INC.
H. J. KRACKOWIZER, Pres.
1342 WEST LAKE ST., CHICAGO

★ To Our Friends in the Industry ★
A HAPPY NEW YEAR
from the makers of
KRAMER REFRIGERATION PRODUCTS

TRENTON AUTO RADIATOR WORKS
Main Offices and Factory, TRENTON, NEW JERSEY
NEW YORK, 210-212 West 65th Street PITTSBURGH, 5114 Liberty Avenue

Rempe "FIN COIL" Company
STEEL COPPER ALUMINUM

State Distributors Wanted
Liberal Discounts

340 N. Sacramento Blvd.
Chicago, Illinois Kedzie 0483
Methyl Chloride, Freon, Sulphur Dioxide and Ammonia

Subscription Order

Business News Publishing Co.
5229 Cass Ave., Detroit, Mich. Date.....

Enter my subscription to Electric Refrigeration News for one year (52 issues).
U. S. and Possessions and all countries in the Pan-American Postal Union, \$3.00 per year. Canada, \$6.00 per year (due to special tariff). All other countries, \$5.00 per year (U. S. money).

Enclosed find remittance. ☐ Send bill.

Name

Attention of In Care of

Street Address City and State

We sell the refrigerator and
(Please indicate other products or principal line of business.)
12-26-34.